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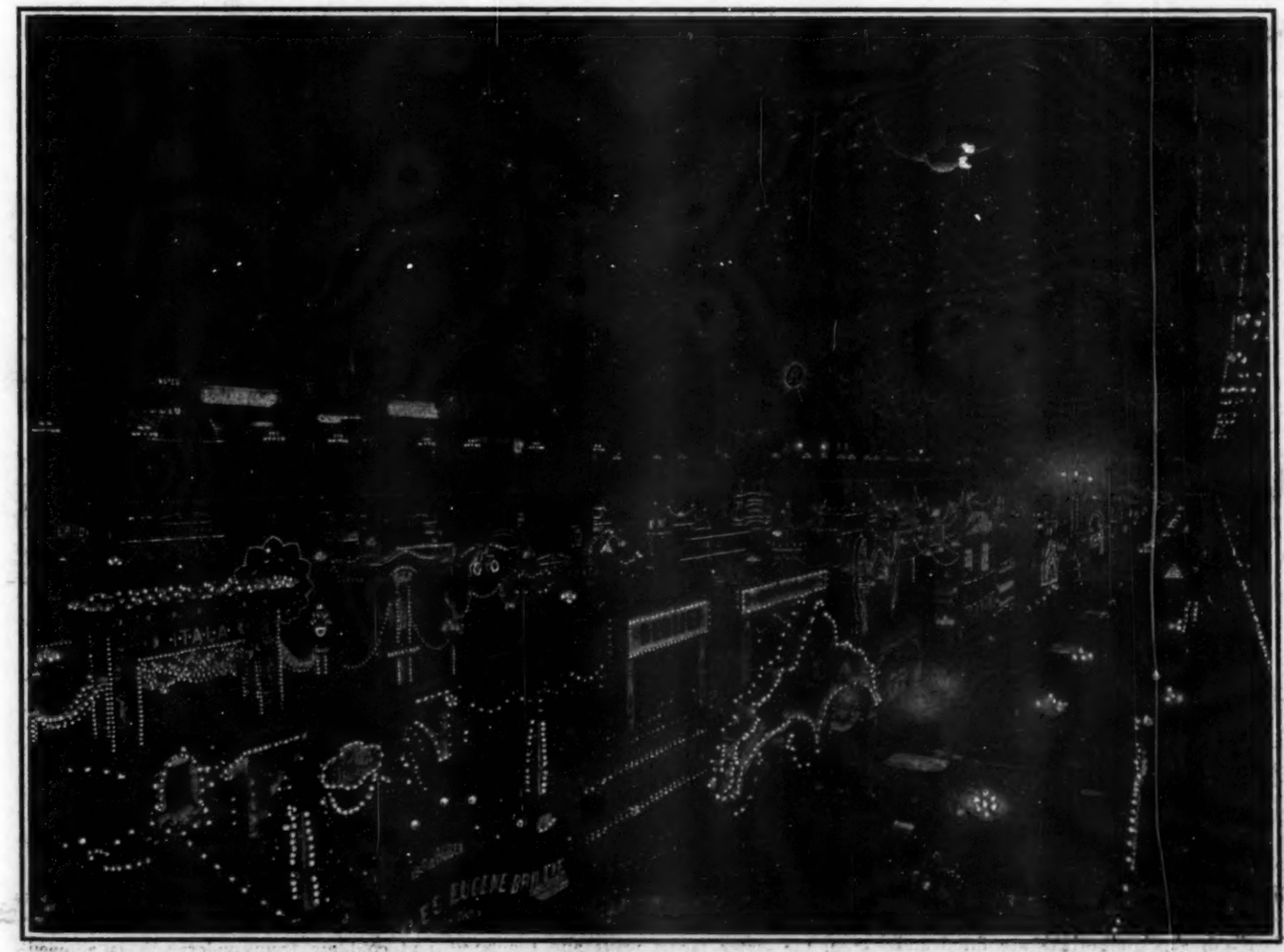
1906 MODELS AT THE PARIS SALON.

BY RENE M. PETARD.

PARIS, Dec. 12.—A point amongst others that forcibly impresses itself upon the visitor at the Paris show is the large number of cars made which, by their power, weight, mechanical excellency and the care devoted to the execution of their very minutest details, show that they are evidently made for only the highest class of trade and that it now becomes exceedingly difficult to discern amongst them what it is conventional to call the "leading makes," so many being the worthy new and old candidates to the title.

Starting with "The" pioneer concern (everybody says "Panhard"), we find that the old French house of reliability has changed but little of the 1905 models. The separate cylinders are strictly adhered to, and their construction stays identically the same as that of the past in both the forged steel and the cast-iron types. The valves are



PARIS AUTOMOBILE SHOW BY NIGHT—SHOWING BEAUTIFUL ELECTRIC ILLUMINATION OF MAIN HALL OF THE GRAND PALAIS.

REAR SPRING SUSPENSION OF PANHARD TOWN CAR.

always symmetrically placed on either side of the cylinders, the plugs above them being held down by the usual type of two bolts yoke. The inlet camshaft still carries the familiar variable profile device, consisting of a small hinged part which is caused to protrude or fall down below the minimum opening fixed profile of the cam by the sliding wedge inside the camshaft. The pump and magneto are both placed on the same side of the engine, being driven by the same line of shafts, a spring being interposed between two stub shafts to drive the pump so as to permit this weaker part of the transmission to break without causing any further damage should, for any reason, the pump fail to rotate either because of dirt stopping it or else because of its getting frozen up solid. The pump remains of the ordinary centrifugal type. The magneto is of the Eisemann system, high tension to conventional spark plugs, and is most readily accessible. This for the exhaust or left side of the engine.

On the right-hand side is placed the carbureter and with it the throttle.

In the 50-horsepower from which the foregoing pump and magneto details come, the control of the engine is by a hydraulic governor which was adopted last year, This governor, which the Panhard people state they will abandon and won't supply any more to the trade on account of its lack of regularity, is in a casing cast in one piece with the Krebs carbureter, which in all other respects stays unchanged. Incidentally, we shall say that upon inquiry we learn from one of the directors of the Panhard company that, starting from now, the Krebs carbureter will be supplied separate to other manufacturers, who may express the desire of using it, in fact several firms in France amongst the less important ones have already availed themselves of this advantage.

In the 24 and 30-horsepower models the foregoing description of the engine stands good. In the 18-horsepower everything stays unchanged from last year, this model being the smallest one which the makers term a "touring vehicle." A smaller size is, however, made, which, although it would certainly be better for touring than many other cars used for the purpose, is more especially designed for town use. The frame is very low, always armored wood, as in all other models; three-quarter elliptic springs are used at the rear, the upper third of the spring taking the place of the forged pump handle before fitted.

Truffault shock absorbers are fitted and the vehicle as a whole is wonderfully smooth riding. The power plant consists of a 15-horsepower engine with four cylinders of the usual Panhard description, but with chain-driven magneto on the dash; the magneto is also of the Eisemann high-tension system. The wood wheels are 870 by 890 mm. at the front and 880 by 120 mm. at the rear, which dimensions are very ample and should go towards a very reasonable upkeep in tires, especially in town work.

One of the most important characteristics in Panhard work this year is the adoption of the multiple plate clutch (which had hitherto been reserved for the racing or semi-racing models) on the touring models, and the reduction in the size of the gear box, which gives direct drive on top speed with the secondary shaft not running idle but actually standing still on that speed, and also the forming of the gear box and differential casing in two separate units connected by a fairly long shaft, *without any universal joints whatever*, so as to obtain very short chains, allowing extremely wide side entrances without being disturbed by the front sprockets and their chains. The spaces reserved for the bodies on the Panhard models are:

Fifteen-horsepower (motor in front), 210 cm. by 85 cm.

Fifteen-horsepower (motor under the driver's seat), 160 cm. by 85 cm.

Eighteen-horsepower, 250 or 260 cm., at will, by 85 cm.

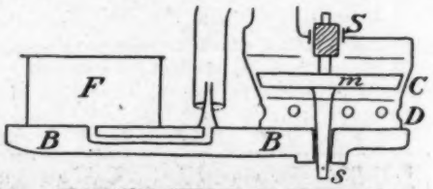
Twenty-four, 35 and 50-horsepower models, 250, 260 or 270 cm., at will, by 90 cm.

The list prices in Paris, which have been considerably reduced over those of last year, are now: 15-horsepower, 12,000 francs; 18-horsepower, 14,500 francs; 24-horsepower, 20,000 francs; 35-horsepower, 26,000 francs; 50-horsepower, 32,000 francs.

Next might be considered Renault, which contrarily to its show neighbor Panhard shows largely varying types of motors and cars. First of all, the 8-horsepower, with two cylinders, which receives very little attention, as it is a rather underpowered affair which does not find many admirers in these times of touring machines built upon racing chassis.

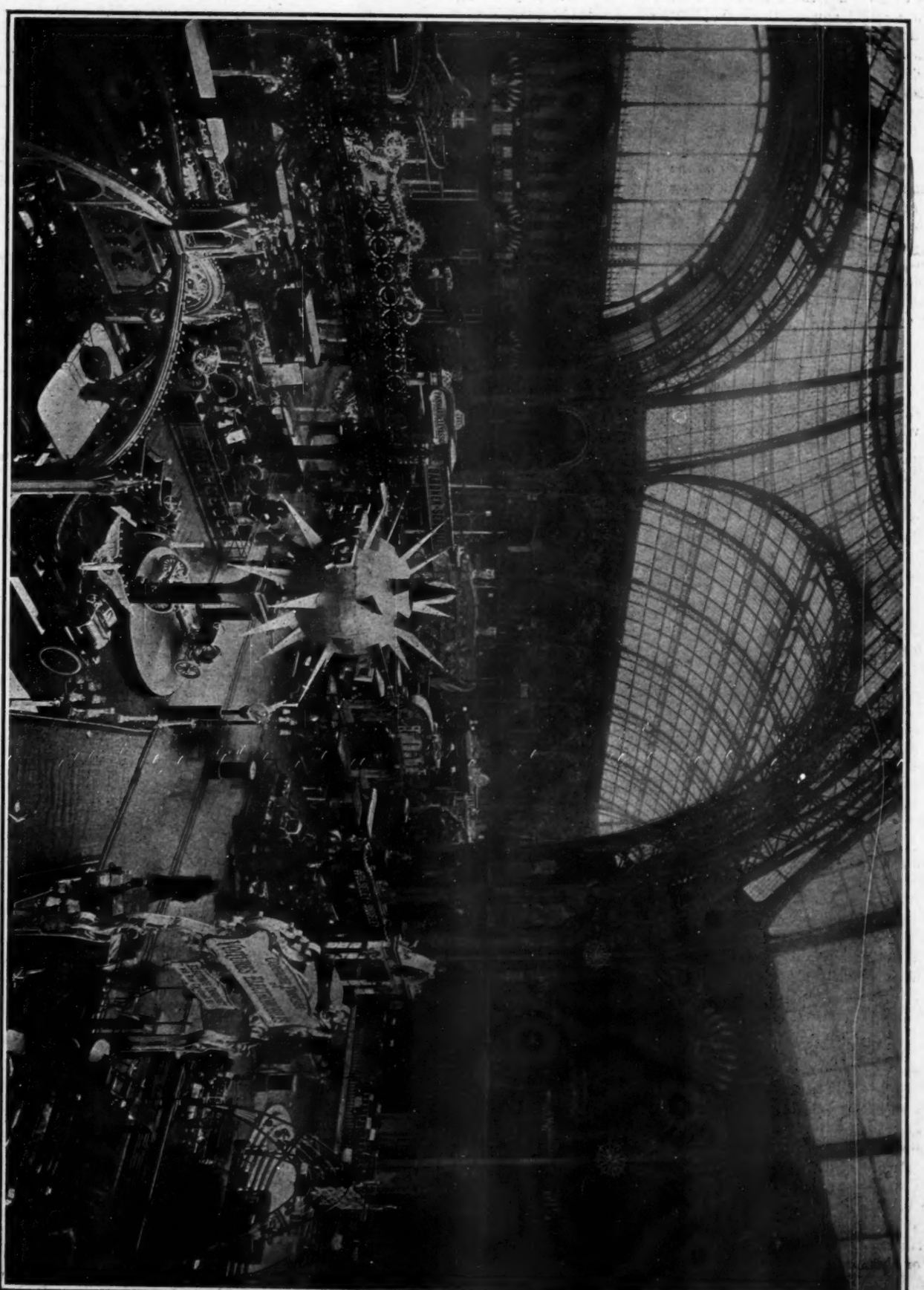
More interesting is the 10-horsepower, which is distinctly a town machine hardly suitable for any other use. At the very first sight the naked chassis of this machine strikes one as a new affair unlike all others; in fact such is the case. The engine consists of four cylinders cast all in one piece but with wide air and water spaces between each, the water jacket walls and the box plate only being common to all four. This engine is fitted with automatic inlet valves, which are placed on the same side and above the exhaust valves. The lift of the inlet valves cannot be regulated by hand, and the gas is led to them from the carbureter placed on the other side of the engine through a casting which is common to all four and pretty well covers up the whole top of the engine. A single water inlet and a single water outlet are used. The ignition is by high-tension magneto and by jump spark and battery working both on the same plugs, the magneto being an extremely small one, and the whole ignition shaft line being placed across the frame in front of the engine and driven by skew gears from the engine shaft, as in all other types of Renault cars.

All the Renault machines of this year are fitted with a new carbureter which, although embodying the same principle as the one used last year, is considerably simpler. One nozzle only is used and is in communication with the float chamber, by means of the special ducts bored out of the base plate *B*.



SECTIONAL SKETCH OF PEUGEOT CARBURETER.

Screwed on to the gasoline feeding duct is the nozzle, which projects upwards in a perfectly accessible and entirely open position; coming down over this nozzle, as shown in sketch, is simply a small copper tube, a little over 1-2 inch, which runs up to the throttle casing close to the valves. Alongside these parts is a large chamber borrowing the form of a truncated cone *C* placed over a short cylindrical part *D*, and from one side of the top of which starts a pipe which runs alongside the small pipe before mentioned up to the throttle. Inside the truncated cone part is a heavy bronze disc about 4 inches in diameter and 1-4 inch thick, *m*, which is guided at its lower part in a slide *s* formed in the base plate *B* and at its upper part by a steep pitch screw *S*, screwing into a nut formed integral with the top of the casing. The sides of the disc are beveled in order to allow the disc to rest on the lower part of the truncated cone in ordinary circumstances, seating itself there much in the manner of a poppet valve. Large holes are drilled in the lower part of the casing on part *D*, which holes freely communicate with the outer air. When the engine revolves very slowly, the thick mixture formed around the nozzle in the small pipe is sufficient to keep it running, but if the speed is increased the increased suction from the piston will be sufficient to lift the disc off its seat, the steep pitch screw preventing too sudden motions to take place, and cold air from underneath is allowed to reach the throttle. In the latter, the two



GENERAL VIEW OF ROTUNDA AND WING OF GRAND PALAIS DURING INTERNATIONAL AUTOMOBILE SHOW WHICH CLOSED IN PARIS SUNDAY NIGHT, DECEMBER 24.

tubes before mentioned meet, and the throttle is of such a form, combining a sliding and a rotating motion, that suitable openings determined once for all present themselves at the mouth of the pipes and are intended to correct what small errors are constantly found in the proportioning of the mixture in automatic carbureters of any type, all this being accomplished by a single motion of a single lever within the driver's reach. The arrangement is such on the 10-horsepower model that a small lever on the dash sets the throttle to the desired speed, no governor being used, while a foot pedal permits any degree of acceleration above the set speed without altering in any way the setting of the hand lever.

The same carbureter is used on all the other cars but with different means of actuating. The engines on the touring vehicles are practically identical with those of last year in every respect, the main change being that in the two heaviest models special alterations to the usual type of Renault gear box, give four speeds and reverse instead of three. The clutch and rear axle stay unchanged, and the small details which are to be found in the car to increase its convenience in handling and adjusting will be described under a different heading. The types shown in naked polished chassis form are the two-cylinder 8-horsepower, the one-piece four-cylinder 10-horsepower town vehicle, the four-cylinder cast in pairs 14, 20 and 30 nominal horsepower models, all fitted with the usual Renault live axle drive and thermo-syphon cooling system, with radiator in front of the dash.

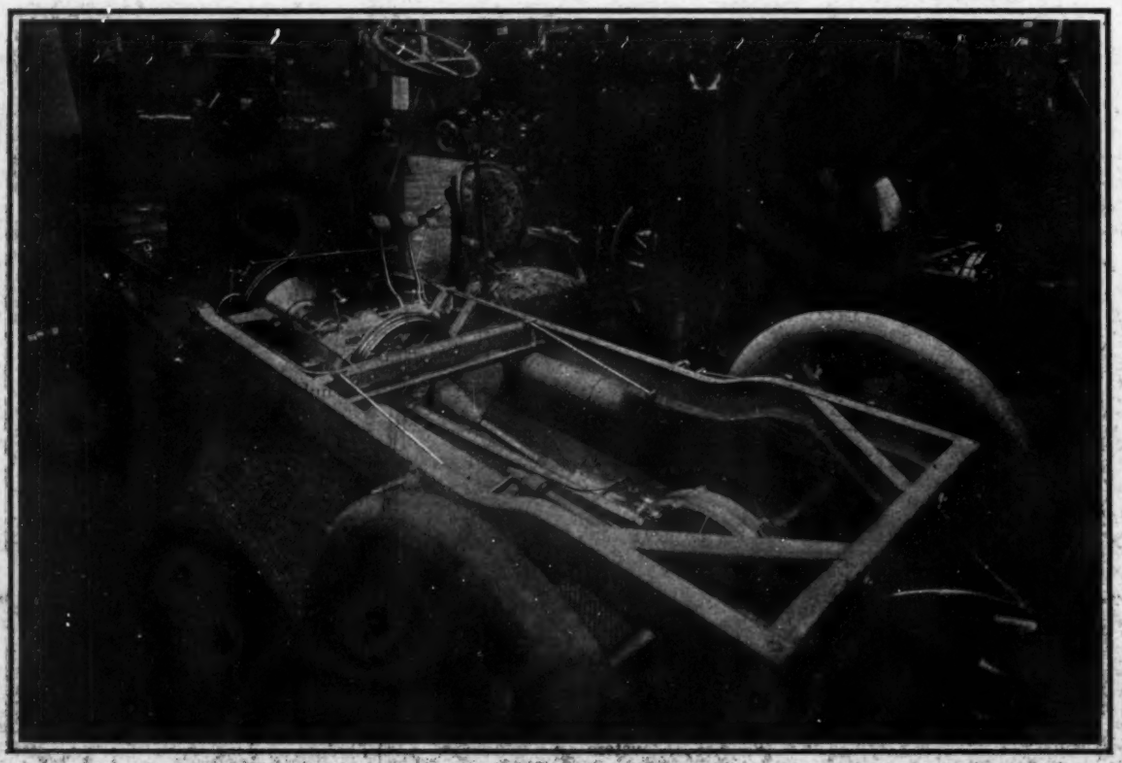
(To be continued.)

Tendencies in Car Details at the Salon.

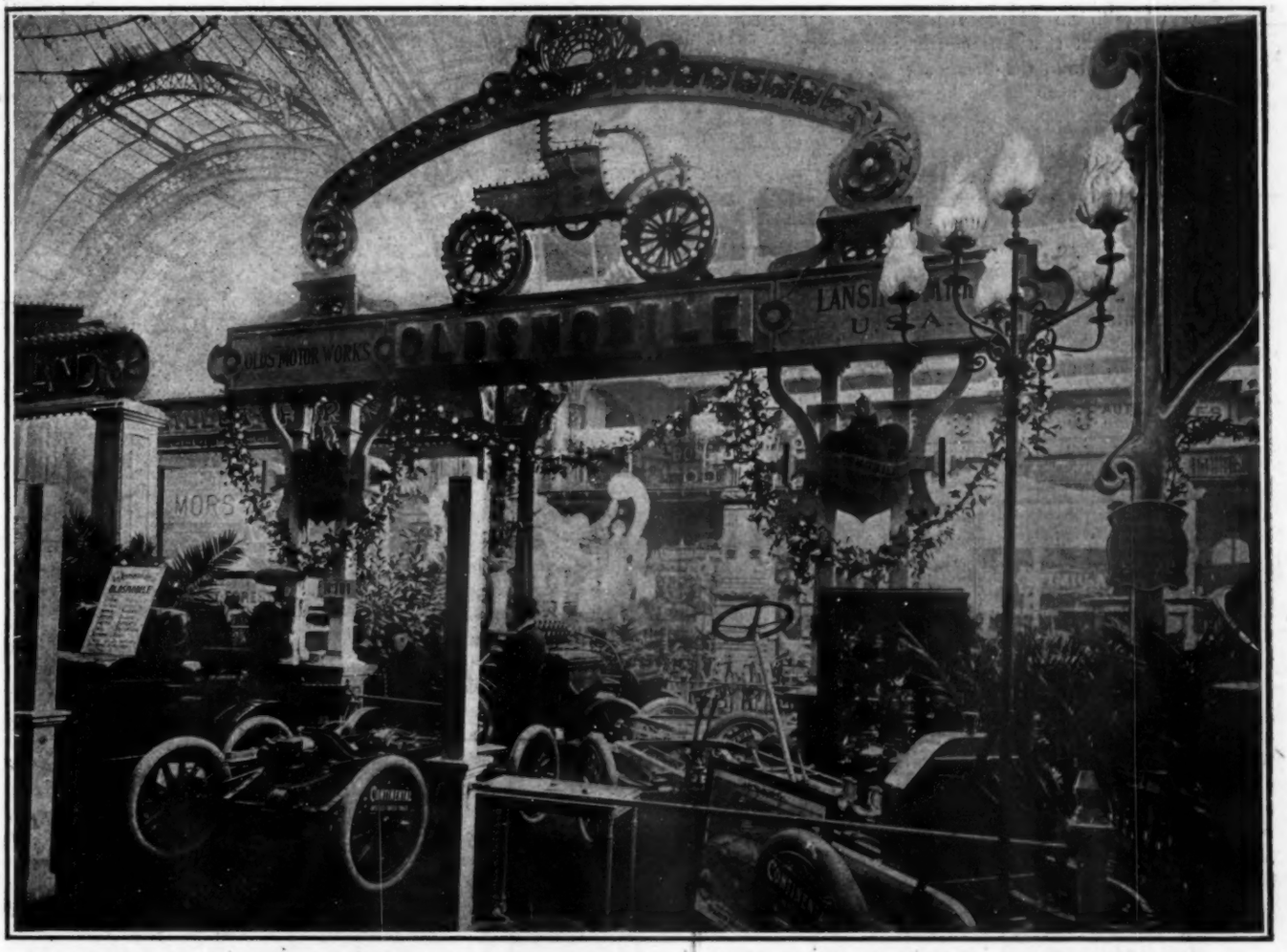
PARIS, Dec. 12.—The general lines along which important developments have been taking place in the generality of the vehicles shown at the Salon have already been outlined in a previous technical article, which might well have been entitled: "The general impression made by a bird's eye view of the Paris Salon." The statements made concerning the tendencies exemplified in the best makes of machines, however, require a more detailed study of the particular systems used by the different designers, to be fully justified. In order to do this systematically the entire anatomy of the modern automobile will have to be studied, part by part, but unfortunately, perhaps, a little too briefly; the improvement, especially in the details, being such that the compass of this article would be insufficient to cover even a small fraction of all that suggests itself concerning some of the more important components of the machines.

Starting from the ground upwards we find first the tires, but as these are of absolutely special character, a separate study of them will be made elsewhere and the wheels also discussed. Despite the good results obtained from wire wheel in numerous speed and endurance contests this year both in France and England on machines of all powers from the Darracq and Napier racers down to the smallest voiturettes, we find that on stock cars of any description except perhaps a few that really belong more to the motor bicycle class, the artillery wood wheel is absolutely the rule, its construction staying unchanged from last year, except that instances are more numerous in the present show of tapered hub bodies permitting to draw the spokes outwards and thus tighten a loosened wheel by going over the bolts that unite the hub flanges. On the cheaper machines undue use seems to be made of an inferior class of cast materials for the manufacture of the hubs.

A point worthy of note is that, after the gradual disappearance of the side chain for cars of low and moderate power the practice of the former years had been to fasten the emergency brake drums directly on the hub, thus leaving the wheel spokes entirely unsupported for their whole length, while such was not the case with the chain driven cars, in which the rule was to bolt the driving sprockets on to the spokes fairly close to the rim. Attentive study of the new conditions of working of the new type of wheel thus evolved, and the experience gained during the time elapsed since the more extended use of the live axle drive has shown that this is a defective practice, and it has been found necessary to supply the spokes with a supporting member uniting at least every pair so as to form a more solid whole. In consequence, on the highest grade shaft drive cars the brake drums are fastened to the spokes somewhere in the central third of their length; thus forming the desired



CHASSIS OF RENAULT 10-HORSEPOWER CAR, SHOWING CLUTCH, BRAKE, PROPELLER SHAFT DRIVE AND AUTOMATIC STARTING APPARATUS.



DISPLAY OF AMERICAN RUNABOUTS AND LIGHT CARS AND CHASSIS IN MAIN HALL OF GRAND PALAIS DURING PARIS SHOW.

support, exactly in the same manner as is customary with chain drive wheels. This presents the further advantage of permitting the use of larger brake diameters without causing any torsional strains on the hub, while the braking power being applied close to the rim the mechanical conditions are distinctly improved. Another point, and a noteworthy one in favor of the system, is the stronger "appearance" of the wheel, which then looks less flimsy in comparison to the extremely bulky bodies now fitted as a standard.

The pressed steel wheel in the full web type does not appear on any of the touring cars shown, but is found in several commercial vehicles, at the same time the tubular built up steel wheel is now existent. From the form generally given to the wheels it results that artillery bubs are universal, no noteworthy improvement in their general lines being found. It is to be found, however, that on the average and even the lightest machines the size of the hubs has been increased, this coming first from the increased diameter of wheel spindles caused by the greater weight of the new bodies used and second the use of ball bearings or the pretention to appear to be using them even if such is not the case. In, fact, it seems no very great increase is to be found in the number of the firms using ball bearings in their wheels, this being caused by the quite general belief that for the load imposed on a car hub with the present weight of fast touring cars, and considering the shocks to which the hub is subjected and the speed at which it runs, it is pretty difficult for a ball bearing to be made within a reasonable price and size that will stand for a really long period.

Passing to the axles, we find more and more live axles for the rear drive, the construction of these becoming every year stronger in appearance and in fact, while total weight of the part is hardly increased. The "floating" axle type in which the driving effort is transmitted by shafts which have absolutely no other duty to perform—the live axle casing being used to carry the weight of the car by extending it through the wheel hubs—is becoming the rule. Thus no more trouble should be experienced (as was sometimes the case in the past) with spindles snapping right at the joint between the hub and the axle casing. Another type which is constantly gaining in popularity and deserve to, is the double back bridge system in which a down or back bent solid rear axle is used to carry the wheel hubs on its hollow ends while at its center is bolted on suitable lugs to the differential casing, the down sweep of the solid axle being designed so as to permit the centering of the differential casing bearings coincidently with the axis of the hollow axle ends. Two shafts are then passed through the spindles into the bosses formed in the center of the differential wheels, resting on the bearings of the differential case. A castellated piece of steel, or else a spider, is then slipped over a square or a keyway formed on the end of the already mentioned driving shafts, these pieces meshing with corresponding work on the hub ends, the whole being covered up by the hub cap. It will be seen that in such a construction better theoretical results are obtained than in the ordinary or in the floating axle systems, as in these it is quite a difficult matter to obtain a perfectly rigid casing for the differential, even when tension or truss rods are used, as there are generally at least three distinct parts assembled, each of which is likely to develop weakness or even simply undue elasticity, thus conducing to a short life and axle sagging.

It is claimed that this construction partakes of some of the advantages of the chain. While this seems to be a rather particular point to discuss, it will certainly be better to leave the discussion open to

the personal criticism of the readers. It is, however, evident that this construction is vastly stronger than the preceding one. In some instances, such as in the case of the Aries cars, small-range universal joints are fitted in the differential gear hubs to permit slight torsions caused by the elasticity of the metal in the axle when a shock of more than ordinary severity has to be withstood.

(To be continued.)

Body Styles and Touring Conveniences.

By WILLIAM F. BRADLEY.

PARIS, Dec. 12.—Real progress has been made by automobile body builders in the four essentials of strength, lightness, comfort and elegance, and among the many specimens exposed at the Salon by well-known French builders, are several which appear to be perfect for their respective classes of work. Houses on wheels, and other such freak bodies, are not present at all, but there are in their place limousines and touring cars possessing all the essentials for comfortable travel in a practical form.

At the Léon Bollée stand is a new type of limousine body just brought out by the firm of Kellner & Ses Fils, and named by them the St. Christophe body. The principal feature of this body is that the two rear corners have been flattened down, forming a flat panel bevel about five inches wide at each corner. In the gallery on the roof the same idea has, of course, been carried out, the side and rear guards being united by a piece running across cornerwise. This results in a distinct gain in elegance over both the square angle and the rounded end body, and gives the car a particularly handsome outline when viewed from the rear; at the same time there is no loss of internal space compared with the two forms mentioned. The body is painted in a rich crimson with narrow black and lighter crimson perpendicular striping; all outside fittings are in polished brass; the roof and gallery, or railing are in black, the gallery having brass terminals.

Inside the car is upholstered in grey broadcloth, with all metal fittings electroplated and woodwork of polished mahogany. The rear seat is very wide and is supported on metal runners, permitting it to be pulled out about ten inches. A handle is fixed on the front for this purpose, and has to be turned around slightly to release the seat. Immediately on letting go of the handle the seat is locked in position. Opposite the rear seats are two folding seats which close up flat against the front of the car. On the outer edge of each of these seats is a projecting metal pin fitting into a socket on the door; thus, when the seats are occupied it is impossible for the doors to open, and they can be leaned against without fear. Upon rising from the seat the whole shuts up automatically, leaving the doors free to be opened.

Between the two seats, and placed at a convenient height, is a small, folding mahogany table, and immediately above it a small but completely equipped toilet case, containing mirror, cut-glass bottles, etc. Under the rear seat is a large mahogany drawer, with special compartment for a hat and storage space is provided by side pockets., while a net close to the roof provides accommodations for light objects.

The side windows, the bottom inner corners of which are suitably rounded off, are fixtures, being secured by easily removable metal angle pieces of small size. The windows in the door and in front let down into pockets, and to prevent all rattling are secured by a pin passing through the top of window frame and into the bodywork. Every detail that could add to the elegance and finish of this car has been carefully thought out. Thus, on either side, between the side window and the door is a tubular flower rack encircled with chased silver bands and having glass tubes for water. The braiding is of a special design in the *art nouveau* style, and even the end of the window strap has received attention, the terminal being a velvet bulb with corded embroidery of artistic design. Electric light is provided, the storage batteries being in a chest under rear seats and opening from back of car. This elegant automobile has been bought by Norris N. Mason, of New York, and will be exhibited by him at the New York show.

A Muhlbacker limousine shown by Léon Bollée has movable panels to fit into the rear window frames, the inner side being thickly padded and upholstered in harmony with the rest of the body, and the part visible from the outside covered with pleated brown cloth.

Decauville Winter and Summer Body.

The Decauville people show an interesting body by Audineau, which can be readily converted from a closed town vehicle to an open touring car, and this without any apparent sign that such change is possible. The sides are readily removed by unscrewing bolts inside, hidden from view by the upholstery, thus transforming a limousine into a double phaeton with fixed dash and extended top. When the sides have been removed a padded arm rest is placed over the exposed groove and the remaining portion is covered by a piece of rounded polished mahogany, both so arranged as to be screwed on with the least possible trouble. When these are in position there is absolutely nothing to show that the car has ever been anything else than an open vehicle.

This limousine, upholstered entirely in grey broadcloth, has rear seat wide enough for three persons and two folding seats just behind the bucket seats and folding up close to the latter. Each of the folding seats is fitted with a back composed of side members and a cross section or back proper. If it is not desired to use the back, it can be closed down, the side bars fitting at each side of the seat and the back rest forming an extension. The glass front of the rear compartment is in three parts, two of the windows being hinged to open inwards, and the whole being so hinged as to close up against the roof. These windows are fastened by a clip and can be secured perfectly tight by means of a small thumbscrew. From the extended top to the top of the dash is also a glass screen, hinged to close up against roof. The two side windows are also made to open, one-half folding back on the rear half outside and being secured by a brass clip. The hinges are completely hidden in the woodwork.

There is a speaking tube to driver, electric light, rear window, blinds on spring rollers all around, and all metal fittings are electroplated. Externally the car is painted a rich crimson with a darker striping and the lower portion of the body is black.

Building Convertible Limousines.

A very large number of makers have attacked the problem of constructing a vehicle suitable for both summer and winter use; that is, a car with all the elegance of a limousine and all the airiness of an open touring car. Roux & Pichard show a limousine that can be made into an open car at a moment's notice, and in which the problem of an all-the-year-round car appears to have been perfectly solved. The side windows are hinged at the top, and by releasing a bolt they can be closed up against roof and fastened there by means of a strap and a clip.. The window frame is hinged at its base, and by releasing a spring can be made to fold down into the inside of the car where, by an arrangement of the upholstery, it does not protrude. The forward half of the window frame is a portion of the roof support, and remains in position even when the car is used as an open vehicle. Front windows let down into pockets, and the extended top can be lifted off by unfastening four thumbscrews, thus changing a limousine into an open car with fixed back and top as far as the rear of the front seats, the complete transformation being effected as readily as the strapping of a portmanteau.

Internally, the Roux & Pichard limousine is elegantly fitted, the upholstery being in grey broadcloth; there is a rear seat for two, and two folding and pivoted seats, electric cigar lighter, electric light in the roof. with wire passing outside and so arranged that the driver can switch off the current without going inside; blinds for all the windows, and electroplated fittings. Despite its size and the width of the rear panels, the body is built entirely in wood, its total weight being about 990 pounds.

A main feature of the limousine exposed by E. Vicart Fils is that the door windows

do not let down into pockets, but are hinged to the sides and fold back upon the side windows. By means of a bolt on their lower front corner they can be made to form a part of the door and open and close with it.

CONVERTIBLE BODY WITH PORTABLE SIDES.

Léon Buat has not only constructed a convertible limousine, but has provided for the storage of the removable sides on the car itself. The glass window of the door lowers into a pocket, the two side frames are hinged and fold down on to the inside of the door, where they are held by a clip. The wide window behind the front seats descends into its pocket and the sides are lifted out bodily and put into a specially prepared pocket between the front seats and the transverse window pocket. The opening through which they are inserted is only three inches wide and is concealed by a metal plate secured by two thumbscrews.

The well-known firm of Lamplugh has on its stand an elegant double phaeton touring body, with fixed back and extended top, finished inside in mahogany and red leather and provided with eight drawers, four being under the rear seats and four under the front seats, all provided with locks. On each of the side doors are two leather pockets with locks. The dais is supported by a stay just to the rear of the front seats, and the gallery occupies the center only of the roof.

PROJECTING WINDOWS AND WOOD FINISH.

Another St. Christophe body, by Kellner, similar in outline to the one shown on the Léon Bollée stand, is exposed by Delaunay-Belleville. The external feature of this car is that the side windows, consisting of three panels each side, project about four inches, the ends being rounded off so as to give an elegance of form and reduce wind resistance. Inside there are window ledges. Only the rear seat and the two pivoting and folding seats are upholstered in cloth, all the rest of the interior, including the roof, sides, door, and the back above the level of the head being in polished mahogany. This style of internal finishing is one of the novelties of the show, and seems likely to become popular, for it is elegant in appearance and essentially hygienic.

The limousine has a small, folding, polished mahogany table between the two front seats, with a leather toilet case above it. In the roof is an electric lamp and at the rear of the roof is a ventilating fan. A feature is an instruction board on the dash immediately in front of the driver, by which on pressing a corresponding button on an indicator board within the car any one of twelve or eighteen orders can be transmitted to the chauffeur. The apparatus on the dash consists of a small box with a red glass top, on which are faintly visible in black letters the words: "Stop, advance, faster, slower, turn left, turn right," etc. By pressing a button the desired word is illuminated by an electric lamp within the box, and at the same time an electric bell rings briskly for a second.

A NOVELTY IN UPHOLSTERY LEATHER.

One of the few novelties of the show in the form of upholstery is a shaded leather which, viewed a few inches away, resembles perfectly a fine art cloth. A closer inspection shows that it is calf. The car on which this new upholstery is used is an elegant little electric with the usual form of bonnet in front and one transverse seat for two passengers. The body is painted in two shades of rich brown with gold lining; all the fittings are in brass, and the leather in two shades of brown. Right in front, where the radiator is usually found, is placed an electric headlight entirely in brass and projecting but two or three inches. For elegance of form, as well as for novelty of upholstery, there is nothing to beat this little electric runabout in the whole show.

THE AUTOMOBILE representative was informed that four calves' skins were used in the upholstery of this car, the only one that has been done in these new shades. Various other double tints have been brought out, all of them of very pleasing effect, and all resembling, except to the touch, the finest shaded art cloths. They do not soil readily, the shades are not too delicate for outdoor use and their wearing qualities are those of the best calf.

PROTECTION FOR THE DRIVER.

At the Panhard stand Henri Labourdette displays a limousine body in which the driver is completely protected. The dash is made higher than usual and curves inward in two successive curves. From the top of the dash to the roof is a glass window the full width of the car, hinged to swing up to and fasten against the roof. The right-hand side is completely closed and access to the driver's seat is only by means of a door on the left side of the car, the hinges of which are to the left and which is opened by a knob sliding perpendicularly. The two doors giving entrance to the rear portion of the body open toward the rear. In the fore compartment the steering wheel is under the curved dash, the controlling levers are on the right and the lubricator is hidden away under the lower curve of the dash.

The C. G. V. people show their new chassis with driver's seat on the left and controlling levers in the centre and with new rear suspension, consisting of longitudinal springs, C springs and a transverse spring. Although a body is not fitted, it is evident that his new form of suspension should give great comfort in riding.

UNIQUE THREE-PASSENGER LANDAULET.

Another novelty is a three-quarter landaulet in which the seat to the left of the driver is enclosed so as to form part of the interior of the car, giving inside two places on the rear seat and one corner seat in front. Thus a landaulet which usually provides accommodation for only two persons, has room for three without any increase of wheelbase. It is a distinct gain of space and the car is much admired by visitors, though it cannot be said that the automobile has gained in artistic appearance. The driver is well protected, for he has the roof over his head and glass windows on each side of his little recess.

A limousine by Mulliner, shown by Charron, Girardot & Voigt, is finished entirely in polished mahogany, only the rear seat, back and two folding pivoted seats being upholstered in red leather. Opened out, these two seats form armchairs; closed, they enter into a chest below the front window, the depth of which from front to back is only about three inches. The doors of these two chests are hinged at top, and when they are opened out two mirrors are exposed.

THE MODEL TOURING CAR.

Those in search of a perfect touring car examine with interest the automobile shown by the Touring Club of France as "the car for touring." The chassis is a 24-horse-power, giving 32 horsepower on the brake, capable, with a 660-pound body, 600 pounds load and 330 pounds of baggage, of traveling at thirty-two miles an hour over varied roads. The body is a double phaeton, Roi des Belges by Rothschild, with side entrance doors opening forward, two bucket seats in front and cape hood with extension to a stanchion running up from each side of the dash. The driver is protected by the new Huillier shield, which consists of a sheet of glass with wooden frame swinging from the upright stanchions. The shield descends to about an inch below the front of the steering wheel and to its lower edge is buttoned a leather apron also attached by means of buttons to the outer edge of the dash. With the movement of the car the glass shield swings freely, but is prevented by the apron from touching the steering wheel. Everything likely to be needed by the chauffeur is contained either under the front seats or in boxes on the running footboard, and the travelers' baggage is carried on a platform in the rear. The rear seat will carry three persons if necessary; there are two folding seats; attached to the back of the bucket seats are racks for carrying rugs, and on the inside of the doors are large leather pockets with flaps. There are two searchlights, two lanterns on the dash, and a tail light, while on the steering column is a small portable electric light with two or three yards of wire, to be used for examing any part of the motor or for reading sign posts at night.

FEATURES OF MERCEDES DOUBLE PHAETON.

The Mercedes firm has a double phaeton touring car with false floor boards in the interior hinged across the middle so that the rear half folds forward, making a sloping foot rest similar to that in front. No hinges are visible and no support of any kind has to be placed in position. The car has side entrance with doors hinged at the front. Two large Louis Vuitton trunks fit under the rear seats and are enclosed by

a metal sheath entirely demontable and shaped to continue the curve of the rear of the body. Under front seats is a locker in which is stored another trunk, accessible from the left side of the car. Under the running board are three metal drawers and two open spaces. Between dash and front seats are low wood doors opening from rear to front and having brass-bound tops. On the left side of the front seat is a swinging lantern which can be moved in any direction and which is intended more especially to light the footboard when entering or descending from the car.

SIDE ENTRANCE SUPERCEDES OTHER FORMS.

In the whole show there are only two or three rear-entrance tonneau bodies, and hinged and revolving front seats, giving access to the rear of the car, so plentiful last year, have this season almost entirely disappeared. Everywhere the side-entrance car is met with, even in touring cars of very moderate power. Where the wheelbase is not sufficiently long to allow a side entrance, a two-seated body only is preferred to a larger one with rear entrance. Inside steering bodies are also very rare, there probably not being ten in the entire exhibition. In the cheapest class of cars, single-cylinder automobiles from 5 to 10 horsepower, and selling as low as $400, of which there are quite a number in the Salon there is practically no body work. The framework of the two seats is an integral part of the two side frames, and is bolted together with them. All that is necessary is to pad and upholster the seat and back, this being almost invariably done in leather. There is a large increase in the number of doors opening from back to front.

QUIET COLORS AND STRIPES PREVAIL.

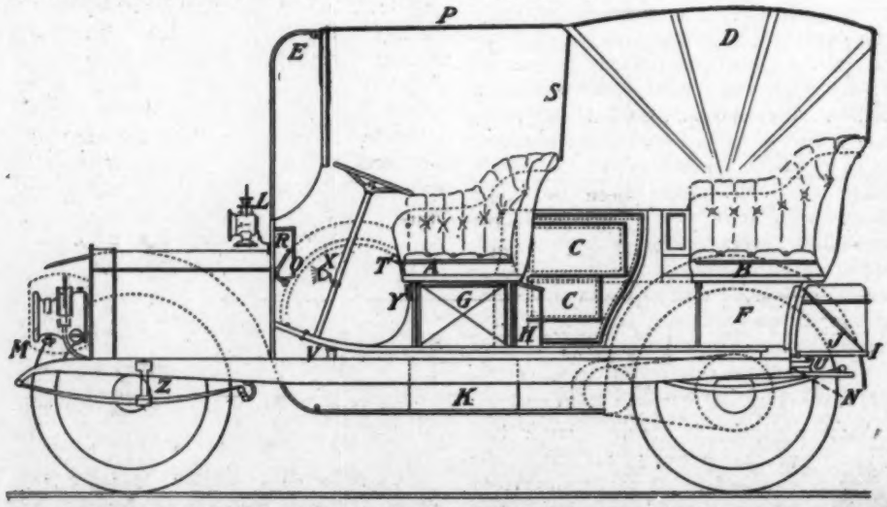
Although there is an endless variety of colors, there is a general tendency toward quietness. Town vehicles are almost always in dark colors, with striping in a darker or lighter shade of the same color. Dark blue and black, with light blue lining, dark green, olive, deep crimson—all of them with perpendicular stripes in a soft tint are the favorites for the most expensive classes of cars. Bright red is popular for big open touring cars, but even here the tendency is towards quieter colors. Strong yellows, white and red, as well as strong contrasts in colors, are not met with now.

LUGGAGE CARRIER ON ZUST CAR.

A new luggage carrier is shown by the Zust firm fitted to a double phaeton touring car with Cape hood and leather extension to supports from each side of the dash. The carrier is made by Pavesi & Crespi, of Milan, the builders of the car body, and consists of two side members in angle metal, broad transverse end pieces in wood bolted to the side frames, and lighter wood cross members hooking onto the side members and kept in position by end pressure. There is also a light metal rail which is bolted to the side and transverse frames. The cross bands are all united and fold up like an accordion when not in use. This carrier is attached to the fore end of the Cape hood and the metal stanchions on the dash by means of thumbscrews. When taken to pieces, it is stored in a case under one of the running boards especially prepared to receive it.

On the same car is a rear luggage rack which pushes under the body when not in use. When pulled out it is secured in position by two hooks fastening onto a beading near the floor of the car body.

At the Benz stand is a body built to private order with a metal luggage carrier in the rear and half a dozen brass rods curved to the shape of the car, secured to the floor of the body. These rods serve both to keep the luggage away from the body and to attach it securely by means of a strap.



SIDE ELEVATION, PARTLY IN SECTION, OF IDEAL TOURING CAR EXHIBITED AT PARIS, SHOWN BY THE AUTOMOBILE CLUB OF FRANCE.

A, Front seat cushions. B, Rear seat cushions. C, Pockets on doors. D, Cape hood. E, Huillier patented shield. F, Chest under seat. G, Tank. H, Chest inside of car. I, Luggage Platform. J, Trunk. K, Trunk on running board. L, Side lamps. M, Searchlights. N, Tail light. P, Leather extension top. R, Chauffeur's chest. S, Shield from hood. W, Lamp covers. Z, Edo patent suspension. On right of car: O, Extra tire with cover. T, Filling tube for fuel tank. U, Filling tube for water tank. X, Portable electric light. Y, Strut. V, Filling tube of oil reservoir.

Pictures at the Paris Salon.

PARIS, Dec. 15.—At the extremity of the top gallery, far from the fashionable crowds, the gaily bedecked stands and the wonderfully artistic illuminations, the directors of the Salon have installed the fine arts section. A series of rooms uniformly draped in red cloth, hung around with oil paintings, water colors, etchings and photographs, its bareness is a strange contrast to the richly carpeted stands, with their thousand lights, rare plants, glistening chassis and stately bodies.

Nobody visits the art section except an occasional enthusiast who intends to get all that the show can offer him. The only sound is the chatter of the saleswomen's voices in the adjoining galleries, for they have very little to do and must fill in the idle moments with woman's never-failing hobby—gossip.

Yet there is much of interest in this artistic section. Starting away back at the beginning of the nineteenth century, the visitor is treated to a series of colored prints showing the genesis of automobilism. Curiously enough, it is England that has furnished nearly all the prints in the collection of the Automobile Club of France, Johnson's Pedestrian Hobby Horse Riding School, in the year 1819, is shown as the precursor of the automobile school of the twentieth century. Then follow scenes from the lives of these early automobilists, who had never heard of a combustion chamber, and, as one passes in rapid review, the engravings showing some of the delicate attentions they received from the veterinary surgeon, the blacksmith and the horse dealer, one's heart softens towards the jury which imposed the last $50 fine for exceeding the speed limit.

At the earliest stage of the industry France has no prints whatever to show, and fills up the gap with illustrations of elegant horse-drawn vehicles and prancing steeds.

In the next room the steam stage is reached with lithographic prints of George Stephenson's *Rocket*, first-class trains on the Liverpool & Manchester railroad, the opening of the Stockton & Darlington railroad and other similar railroad experiments. Caricatures of the hobby horse, and the new steam stage coach guaranteed never to blow up are numerous, and among them is one by Cruikshank depicting the funeral of the hobby.

A section dealing with animal locomotion in the eighteenth century depicts the old French *diligence* and the lumbering English stagecoach in all their ancient glory. Cross the threshold and Panhard, Daimler, Charron, Louis Mors, Levassor and other founders of the industry appear with the wonderfully complicated vehicles which

opened the way for the present day automobile.

The years 1898, 1899 and 1900 furnish many prints and photographs of interest to all who have watched the rise of the sport. René de Knyff in the Paris-Amsterdam contest, Heath on his No. 5 and numerous scenes from the Paris-Bordeaux race are to be seen. Present day automobilism is next reached, and with it a great increase in the number of pictures. Jenatzy figures largely. Théry comes on the scene, and René de Knyff is seen taking corners at terrific speeds. The period from 1900 has supplied plenty of material for the artist, and many a good drawing is to be found. Several of those exposed have already been printed in large numbers and are almost as well known as Whistler's most popular works. There is a splendid selection of lithographic prints in colors which would be admirable as decorative panels for automobile club rooms, or for smoking-rooms.

Only one American scene is shown, this being an illustration of two cars running side by side on the Ormond Beach, while in separate panels are a group of officials and portraits of two victorious chauffeurs.

"Carrying off the Cup" represents Emperor William rushing off at full speed with the Gordon Bennett Cup on his shoulders; in the background are to be seen President Loubet in evening dress and the King of England in a gorgeous military uniform running frantically after the retreating trophy. Close by can be seen the King of Belgium with one hand on the bonnet of an automobile, the other on the shoulder of the German Emperor, dressed, like him, in the fur cloak of a chauffeur, to whom he is confiding that the machine is much easier to manage than his country. Serio-comic scenes are unending, and all those incidents which are supposed to befall those who go on the roads in automobiles have been seized upon by the artists. The originals of many well-known series of motor postcards are also to be seen.

There is less of interest in the water colors and oil paintings section, and, indeed, it is difficult to discover a connection between automobilism and some of the works exposed. A fine oil painting of René de Knyff on a Panhard racer by Louis de Schryver attracts instant attention for the spirit of speed which the artist has so ably placed on his canvas. Reconnoissance of a strategic point, by Henry Perrault, shows two French army officers in an automobile driven by an Alpine chauffeur reconnoitering in the mountains. There is a striking portrait of the Marquis De Dion, a clever little painting of the *Rapière* going at full speed through a calm sea, a very good impressionist painting of a scene outside the Grand Palais—at night—during the automobile show, and a scene outside the Automobile Club of France.

Under the heading of Sculpture twenty works of art have been gathered together, among them being two busts of M. Gustave Rives, director of the French Automobile Show; an automobile cup by Aucoc, the maker of the Gordon Bennett Cup, many chimney decorations and statuettes in which the automobile is the subject of the design. There is a remarkable automobile horn in carved bronze with the hind legs of a toad, an elongated body and a fearfully wide-open mouth and two large ruby eyes. It is of handsome design and clever workmanship by Paul Louchet.

In the photographic section there are few exhibitors but plenty of photographs. In a complete series of photographs of all the principal automobile races and touring contests held in France during the past year, and shown by the official photographers of THE AUTOMOBILE, are naturally a large number of the Gordon Bennett event. Tracy, Dingley and Lyttle all figure in the exhibition by the side of the French favorites headed by the ubiquitous Théry. Some splendid enlargements of the Florio event and the Ardennes meeting are also to be seen.

American Agencies in France.

Charles H. Meigs, who was in charge of the Cadillac stand at the Salon, is placing agencies all over France and in various other parts of Europe. Although only just returned from a long journey in Russia and western Siberia, that was accomplished only with the greatest difficulty, owing to the total stoppage of trains on many railroads, the Cadillac agents will again set out in a few days for the same unsettled country.

It is very probable that the Locomobile Company will establish an agency in France at an early date. Two or three years ago Locomobiles were first placed on the French market. The company's agents are again negotiating, and a move may be expected shortly.

The Columbia agency has left the garage in the Rue de la Boëtie, Paris, for larger premises in the Avenue de la Grande Armée, a thoroughfare devoted almost entirely to automobile retailing and containing the stores of the most important French firms. Columbia cars are well known in Paris, an agency having been maintained there for over six years. During the present winter season there is an especially good demand for American electrics in such fashionable health and holiday resorts as Cannes, Grasse, Nice, Monte Carlo and Monaco.

Rushmore, of searchlight fame, is the latest American to invade the French automobile market. An agency was opened for Rushmore searchlights about two months ago in the Avenue des Champs-Elysées, and since then the searchlights so well known in the states have been extensively adopted in France. Owing to their late arrival on the scene, only a small stand could be secured in one of the obscure galleries of the Salon. Mr. Rushmore is at present visiting Paris and has made arrangements for an extension of operations in France.

Olds Banquet in Paris.

PARIS, December 15.—Taking advantage of the presence in Paris of their representatives from every part of the world, the Olds Motor Works gave a banquet to all their agents and representatives last night, at the excellent Restaurant Durand. John L. Poole, the European agent, sat at the head of the table, and around him were Dwight B. Huss and J. Amrant, at present looking after the interests of the company at the various European shows, and agents from Paris, London, Florence, Christiania, Munich, Amsterdam, Copenhagen, Odessa, Bucharest, Milan, Lisbon, St. Petersburg, Moscow, Berlin, Hamburg, Naples and Algiers.

To say that each spoke in his own tongue would hardly be correct, for all spoke in many strange tongues—or tried to—and the result was a wonderful jargon that none but auto enthusiasts could understand.

A curious fact about the Olds business in Europe is that, notwithstanding the upheaval in Russia, there is no dropping off of the sales of American automobiles. Three trainloads of cars are at the present moment crossing the Atlantic for the land of the czars, and Russian agents attending the show in Paris are placing further orders.

Foreign News Notes.

Director Maybeck, of the German Daimler Works, has admitted the open secret that the new Mercedes cars for racing purposes will have six-cylinder engines. He expressed himself as thinking that six-cylinder motors are eminently suited for racing machines, but that the number of cylinders is superfluous for any other purpose.

* * *

Just before his demise, Clarence Gray Dinsmore presented the Herkomer committee with a sum of 10,000 francs ($2,000) for prizes for the contest.

* * *

The annual Berlin show, from February 3 to 18, will comprise the following features: Pleasure cars, army vehicles, sanitary and first-aid wagons, fire brigade engines and carts, commercial trucks and wagons, motorcycles, auto-boats, tires, parts, spares, accessories, clothes, literature, etc. All intending exhibitors are requested to address Baron von Brandenstein, German Automobile Club, 16 Leipziger Platz, Berlin, W.

* * *

The principal of Cardiff Universiy College, in Wales, lecturing recently on side slips, said that the automobile of the future would be a six-wheeled car, the driving and braking to be done on the middle pair of wheels. Such a car was exhibited a few years ago in Paris.

Megargel and His Companions Very Much Alive in the Mountainous Southwest.

FLAGSTAFF, Arizona, Dec. 21.—When I wrote my last story of the trip at Williams, thirty-four miles east of here, and dated it Flagstaff, I fully expected to be in Flagstaff the following morning. That was Saturday, and I did not reach Flagstaff until Wednesday noon, and then only after the hardest struggling through snow that I have ever experienced or ever hope to again.

Leaving Williams at 9 o'clock at night, we ran about four miles but found the snow and mud so soft that we decided to camp out and wait until after midnight, as by that time we expected the ground would be frozen solid. It was. Leaving our blankets and campfire at 1 A.M. Sunday morning we again started eastward, steadily climbing higher and higher up the side of the mountain. First thing I knew we were in a bog, having gotten off the trail, and our car went in to the body.

We got out our cable and endeavored to find something to which we could attach it. There was nothing in sight but mud and ice-covered water. We planted post after post, but when we applied ourselves to the windlass they were jerked out of the ground. In the meantime our car was continually settling deeper and deeper in the mud, and I knew if it froze where it was we would have a find old time getting it out. The sun was just rising when we eventually cleared the bog and again started eastward, not however until we had had a sup of hot coffee made over a wood fire.

Sunday we pushed on all day, not seeing a house or human being, and steadily mounting higher and higher, the air, all the time, getting colder and colder, until we were nearly frozen despite sweaters, flannels and leather. It was so cold that our leather coats and caps froze as stiff as boards. That day we made about eight miles and slept by the side of a fallen tree, with a campfire burning on either side of us.

Monday morning we again pushed on after a scanty breakfast, for despite our hardship in the Cascade Mountains when we went without food for three days, we had not learned our lesson and only had a light supply of eatables with us on this mountain trip—which under ordinary conditions we figured would take about three hours. Everything went well until noon Monday, when our gasoline supply gave out. How far we were from a railroad or any habitation could only be surmised. Guided by our compass we left the car and in a blinding snowstorm made for the direction in which we supposed the railroad tracks were located. We couldn't find them and retraced our steps to our car, where we again camped out, finishing the last of our eatables.

That night the weather moderated some, and the snowstorm which had been raging all day stopped. By the aid of our campfire we managed to get our feet dry and slept that night quite warm. In the morning we again tried to locate the tracks and met a relief party searching for a rancher named Smith, whom they had just found dead within a mile of our last encampment. He had been frozen to death Sunday night. The searchers were also incidentally looking for us, for when I had telegraphed to the proprietor of the Commercial Hoted to get my letters and express on Friday night, he, knowing I had left Williams, figured we were lost in the storm somewhere on the mountains and so informed the searchers.

MEGARGEL FORDING A SMALL STREAM.

Gasoline was shipped in to us from Williams, and that night we slept at the section house at Bellemont, reaching Flagstaff about 2 o'clock yesterday afternoon. Despite the fact that the snow in places had drifted to a depth of four feet, the Reo *Mountaineer* came all the way under its own power, we refusing the offer of the relief party to ride in with them and tow our car after us.

Upon our arrival at Flagstaff, I found that seven persons were frozen to death during the nights we were out, most of them old ranchmen and mountaineers. Possibly it was because their matches gave out, but more likely because they did not have a little gasoline to start campfires with, for the wood was so wet and damp that without gasoline we never could have started a fire, and had we not kept a bright blaze all night we should certainly have shared the fate of the frozen ones.

Fassett, Vaughan and myself are none the worse for our experience, and you can depend upon it that the tonneau of the *Mountaineer* from this time forth carries fifty pounds of provisions—enough to last us for at least a week. With plenty of food and lots of matches and a little gasoline, we can bid defiance to the fiercest weather that visits the Arizona mountains, even if we are up in the air 7,600 feet.

Of course this delay places us far behind our schedule, and the snow, which has been falling for twenty-four hours, will hold us back. However, we expect to start eastward again this afternoon, snow or no snow, and hope to make Albuquerque by Christmas night.

Although the newspapers throughout the country have been printing, under terrifying headlines, accounts of the frozen New Yorkers, I can assure my friends that we are in excellent health, have retained our appetites, and at no time were we in any great danger, although automobiling on

THE "MOUNTAINEER" IN A SOUTHWESTERN ARROYO WITH A STIFF CLIMB AHEAD.

snow-covered mountain trails in freezing weather is not quite as enjoyable as a summer tour through Ohio, Indiana and Illinois.

PERCY F MEGARGEL.

Through Snow and Lava.

FLAGSTAFF, Arizona Territory, Dec. 17.—After a tedious climb of several thousand feet, the last forty miles being through snow more than a foot deep, we reached Flagstaff, the highest point on the Santa Fé railroad system in Arizona, late this afternoon. From here it will be gradually downhill for about 200 miles, and, although the snow is reported to be much deeper between here and Winslow than west of here, I have every confidence in the ability of the car to cope with it successfully.

One point east of here does worry me a little, and that is the Canyon Diablo or Devil's Canyon, about twenty miles east of Flagstaff. This canyon, 250 feet deep and 500 feet wide, is crossed by a single-track railroad trestle with neither guard rail nor outer planking. It is our only chance to cross unless the old Santa Fé trail crossing, many miles to the north, has been repaired. At last reports this trail down to the bottom of the canyon and up the opposite side had been entirely washed out, leaving the railroad trestle the only means of crossing. My hand is pretty steady at the wheel, but when it comes to crossing such a bridge, the wheels bumping over the railroad ties, and only six inches to spare on one side with a 250-foot fall if anything goes wrong, even a transcontinentalist must pause and do some thinking.

It has been our lot to have to sleep out several nights lately, and with the thermometer running down in the neighborhood of zero and our supply of bedding limited, it differs some from summer camping on the shores of Lake Ontario or Erie. It is usually quite warm and comfortable until about 2 A. M., when it begins to get colder and colder, and, despite the wood we pile onto the camp fire. we are all but frozen at sunup. The cold nights have one advantage—the roads are generally frozen so solid by daylight that it is easy wheeling for some hours, for running through either mud or soft, melting snow has a tendency to hold us back, and we are three days behind our schedule now.

This is all Indian country through which we are traveling now and every little town at which we stop has its suburbs filled with Indian shacks. The famous Navajo blankets are woven in and around Flagstaff and all manner of bead work, bows and arrows, Indian pottery and basket work are offered for sale at the country stores. The white inhabitants are all worked up over the proposed joining of New Mexico and Arizona territories to make one state. From the talk of ranchmen and townspeople, there will be a civil war if such a course is adopted by the government. "To be joined to a lot of ignorant 'greasers' is the worst fate that could possibly befall us," is the way the Arizonian puts it.

Since leaving Seligman we have encountered no sand to speak of, but have run into and through beds of lava rocks that would put any but the very best tires completely out of business, and even our Diamonds suffered. Time and time again we were obliged to stop, get out and build stone bridges across some boulder too large to straddle and so situated that it could not be dodged. Despite every precaution, the front axle and differential hit rock after rock, breaking the front truss rod, tearing away the pet-cock on the rear cylinder and bending the rear truss rod until it ceased to do its share toward supporting the rear axle. The trail had not been traversed for months, and in many places it ceases to exist at all, so that we had to pick out our own route, keeping the railroad track in sight as much of the way as possible.

At the town of Williams, where tourists by rail change cars to run up into the Grand Canyon of the Colorado, about sixty miles to the north, we listened last night to the story of a party that attempted to make the run in an automobile four years ago. The car was an old Toledo steamer, the manufacturing of which was long ago discontinued. It was originally intended for two passengers, but four managed to crowd in, carrying neither blankets nor provisions, expecting to make the run in about four hours. They made about twenty miles the first day and camped out for the night, going to sleep blanketless and supperless. That night it froze and the water cracked the steamer's pipes. The party kept on, however, and made about twenty miles further the next day, when the gasoline gave out. There was not a human being within twenty miles of them and they started to walk. Their trials and sufferings

PERCY F. MEGARGEL AND DAVID FASSETT, THE TRANSCONTINENTAL TOURISTS WHO NEARLY LOST THEIR LIVES IN A SNOWSTORM IN ARIZONA LAST WEEK, IN THE CAR IN WHICH THEY ARE "CIRUMNAVIGATING" THE UNITED STATES.

during an exhausting thirteen-mile walk with nothing to eat for two days and no water make a chapter in strenuous motoring that the cruise of the *Mountaineer* through thirteen states has been nothing to compare with. That was the first and last time an automobile has ever run to the Grand Canyon.

The automobile is not unknown even in these parts. One is owned at Needles, another at Williams, and Flagstaff boasts of two, yet the coming and going of the *Mountaineer* is looked upon as a matter of great interest by the inhabitants. Although only 16 horsepower and weighing about 1,500 pounds, it is the largest machine that has ever been seen, the autos owned here being all of the runabout type. Our frying-pan, "grub" box and sleeping blankets—articles so common to travelers in this section, yet so seldom heard of in connection with an automobile—are subjects for constant practical jokers to pun over, horsemen saying that the only safe way to travel by automobile is to carry blankets and food enough for days to come. Just how long the animals owned by these jokers would last on a 7,000-mile trip, such as our car has to its credit, is a matter for speculation.

Gasoline can be had at all the little towns through which we have passed with the exception of Peach Springs. Here we expected to replenish the tanks, but not a drop could be got. We wired to Seligman to put a case on on the first freight out, which was done and we were held up for only about seven hours. Lubricating oil, however, is a different matter, and I would strongly advise tourists to ship what they need into this country before starting on a tour. The Standard Oil Company, at Los Angeles, booked our order for the entire trip East, sending supplies to designated places along the Santa Fé from Los Angeles. Later shipments will be from Denver, Kansas City, St. Louis and Philadelphia. It would be a serious matter to run out of lubricating oil in Arizona, although Williams is only twenty-four hours distant by express from Los Angeles.

The performance of our little car through deep snow has certainly surprised its crew. A foot of snow, when frozen more or less solid, seems to have little or no effect on our speed, and we plough through the soft snow without any great effort. It is certainly much to be preferred to the deep sand, although the car behaved gallantly in crossing the several hundred miles of desert last week.

PERCY F. MEGARGEL.

Pieces of wood fixed to the front steering rod are very commonly used in France to prevent the rod from being damaged. For example, if the car accidentally runs over a dog, an unprotected rod might easily get bent or even broken. The wood battens help to diminish the force of the contact.—*The Autocar*.

Complete List of Chicago Show Exhibitors.

CHICAGO, Dec. 23.—Samuel A. Miles, general manager of the Chicago Automobile show, which is to be held from February 3 to 10, at the Coliseum and First Regiment Armory, returned from New York during the early part of this week. He said that no more applications for space could be accepted, as the space was all taken but that if, by any chance, a few more feet could be found any place in the buildings, those on the waiting list would be accommodated.

It is the opinion here that the coming show will be the largest automobile exhibition ever held in America, and strenuous efforts are being made to make the two buildings as attractive as possible.

Mr. Miles has given out the official list of exhibitors, which is practically complete, as follows:

COLISEUM, MAIN FLOOR.

Apperson Bros. Automobile Co., Autocar Co.

Baker Motor Vehicle Co., Bartholomew Co.

Cadillac Motor Car Co., Corbin Motor Vehicle Co.

Duryea Power Co.

Electric Vehicle Co., Elmore Manufacturing Co., H. H. Franklin Manufacturing Co., Ford Motor Co.

Haynes Automobile Co., Holsman Automobile Co.

T. B. Jeffery & Co.

Knox Automobile Co.

Locomobile Co. of America.

Mitchell Motor Car Co.

National Motor Vehicle Co., Northern Manufacturing Co.

Olds Motor Works.

Packard Motor Car Co., Peerless Motor Car Co., Geo. N. Pierce Co., Pope Manufacturing Co., Premier Motor Manufacturing Co.

Reliance Motor Car Co., Royal Motor Car Co.

F. B. Stearns Co., J. Stevens Arms and Tool Co., St. Louis Motor Car Co., Studebaker Automobile Co.

E. R. Thomas Motor Co.

Waltham Manufacturing Co., Wayne Automobile Co., Winton Motor Carriage Co., Woods Motor Vehicle Co., White Sewing Machine Co.

COLISEUM ANNEX, FIRST FLOOR.

Auburn Automobile Co., Austin Automobile Co.

Buick Motor Co.

Chicago Automobile Manufacturing Co.

Jackson Automobile Co.

Pierce Engine Co., Pungs-Finch Automobile and Gas Engine Co.

Tincher Motor Car Co.

Vehicle Equipment Co.

Welch Motor Vehicle Co.

COLISEUM ANNEX, SECOND FLOOR.

Automobile Supply Co., Aerocar Co.

Beckley-Ralston Co.

Cook Railway Track Appliance Co., Continental Caoutchouc Co., Columbus Buggy Co., Chicago Pneumatic Tool Co., Cullman Wheel Co.

Dac Automobile Supply House, Dayton Folding Tonneau Co., Dorris Motor Car Co., Joseph Dixon Crucible Co., Duff Manufacturing Co.

Excelsior Supply Co.

Gaulois Tire Co.

Hendee Manufacturing Co.

Imperial Brass Manufacturing Co.

Knobloch-Heidman Manufacturing Co.

London Automobile Supply Co., Limousine and Carriage Manufacturing Co.

Manhattan Storage Co., Mason-Kipp Manufacturing Co., Motor Car Equipment Co., Motor Car Co.

North Chicago Machine Co., Nordyke & Marmon Co.

Railway Appliance Co.

Sherwin-Williams Co., Samson Leather Tire Co., Standard Carriage Lamp Co.

Universal Storage Battery Co.

Volta Battery Co., Vesta Accumulator Co.

Windsor Automobile Co., Whiteley Steel Co.

COLISEUM, GALLERY.

American Electric Novelty and Manufacturing Co., Atwood Manufacturing Co., Aurora Automatic Machinery Co., Autocoil Co.

Badger Brass Manufacturing Co., Baldwin Chain and Manufacturing Co., Belden Auto Transmission Co., Brown-Lipe Gear Co., Brennan Manufacturing Co., William H. Brown, S. F. Bowser & Co., Briscoe Manufacturing Co., Byrne, Kingston & Co.

Consolidated Manufacturing Co.

Detroit Motor Car Supply Co., Detroit Steel Products Co., Diamond Rubber Co., Diamond Chain and Manufacturing Co., R. E. Dietz Co., Dayton Electric Manufacturing Co.

Edmunds & Jones Manufacturing Co.

Firestone Tire and Rubber Co., Fisk Rubber Co.

Gabriel Horn Manufacturing Co., B. F. Goodrich Co., Goodyear Tire and Rubber Co., Gray & Davis, G. & J. Tire Co.

Hartford Suspension Co., A. W. Harris Oil Co., R. E. Hardy Co., Hartford Rubber Works Co., Hyatt Roller Bearing Co., Hine-Watt Manufacturing Co.

International A. & V. Tire Co.

Jones Speedometer.

Long Manufacturing Co.

McGiehan Manufacturing Co., McCord & Co., Morgan & Wright, Motsinger Device Co.

N. Y. and N. J. Lubricants Co., National Carbon Co.

Oliver Manufacturing Co.

Pennsylvania Rubber Co., Pantasote Co., Prest-O-Lite Co.

Rose Manufacturing Co., Republic Rubber Co., Remy Electric Co.

Spicer Universal Joint Manufacturing Co., Swinehart Clincher Tire and Rubber Co., Standard Oil Co., Standard Roller

Bearing Co., Schwarz Wheel Co., C. F. Splitdorf, Shelby Steel Tube Co., Sprague Umbrella Co., Steel Ball Co.

Timken Roller Bearing and Axle Co., Tokheim Manufacturing Co.

Valentine & Co., Veeder Manufacturing Co.

Weed Chain Tire Grip Co., Wheeler Manufacturing Co., Webb Co., Warner Gear Co., Warner Instrument Co., Whitney Manufacturing Co., Wray Pump and Register Co.

ARMORY, MAIN FLOOR.

Adams Co., Acme Motor Car Co., Auto Importing Co., American Locomotive Motor Car Co., American Motor Truck Co.

Buffalo Electric Carriage Co., Buckeye Manufacturing Co., C. H. Blomstrom Motor Co., Berkshire Automobile Co.

Cleveland Motor Car Co.

John L. Dolson & Sons, Daimler Manufacturing Co., Dayton Motor Car Co.

English Daimler Co.

Knight & Kilbourne, Kansas City Motor Car Co.

Logan Construction Co., Lozier Motor Co.

Oscar Lear Automobile Co.

H. Sargent Michaels Co., Moon Motor Car Co., Marion Motor Car Co., Maxwell-Briscoe Motor Co., Moline Automobile Co., McCrea Motor Truck Co.

Palais de l'Automobile, Panhard & Levassor.

Reo Motor Car Co., Rapid Motor Vehicle Co., Rainier Motor Vehicle Co.

Synnestvedt Machine Co., Smith & Mabley, Soules Motor Car Co.

Ralph Temple.

Western Tool Works.

ARMORY, GALLERY.

American Lamp Co., Auto Accessories Manufacturing Co., Eugene Arnstein.

Culver Novelty Co., Chicago Caloric Engine Co.

Gearless Transmission Co.

Hancock Manufacturing Co., Hutchison Electric Horn Co., Hicks Speed Indicator Co.

Kinsey Manufacturing Co.

Look Electric Co.

Milwaukee Rubber Works Co., Michelin Tire, American Agency, J. B. McKeague.

P. Reilly & Sons.

Speed Changing Pulley Co.

Tritt Electric Co.

Ventilated Cushion Co.

Way Muffler Co.

Club Show in Armory.

The new armory of the Sixty-ninth Regiment, which will be opened to the public for the first time on January 13, on the occasion of the sixth annual automobile show of the Automobile Club of America, is well suited for exhibition purposes and is in many ways an interesting structure. Perhaps the chief feature is the great area of the main floor—189 feet by 202 feet, without pillar or other obstruction. Roof and walls are composed of a huge semi-cylinder supported on six steel arches; the maximum height from floor to arches is 100 feet. The building is as nearly fireproof as the architects can make it. Light is admitted through a very large skylight in the roof, and numerous arc and incandescent lights will be used at night. The rear end of the building is closed by a brick wall, while at the front is a four-story brick building in which are company rooms, offices and so on; entrance to the drill hall is by way of an enormous brick arch 90 feet wide and 68 feet high, said to be the largest arch of its kind in the world. A basement extends under all parts of the hall and the administration building, except for an unexcavated space in the middle of the hall. A gallery 18 feet wide runs around the drill hall and is supported, without the use of pillars, at a good height above the main floor. The total floor space is 152,000 square feet. An inspection of the new building will add an interesting feature to a visit to the automobile show, as will also the exhibit of the Aero Club of America, consisting of dirigible balloons, ordinary balloons, aeroplanes, kites, motors, parachutes and other aerial apparatus, besides a collection of samples of fabrics, cordages, varnishes, and other materials used in the construction of balloons and the like.

Florida, Then Cuba.

Arrangements for the 1906 Florida Automobile Tournament are progressing satisfactorily and some fine racing is anticipated. The program of events was published in full in THE AUTOMOBILE for November 2. Though a number of reports as to entries have been circulated, no official announcement on this subject has been made, according to W. J. Morgan. "Yes, there are a lot of stories about the entry list," said Mr. Morgan, in reply to the inquiry, "but I don't know where they came from; certainly not from this office. The list will not be made public until it closes on January 8. There is also a great deal of talk about the two-mile-a-minute cars that will congregate on the beach, but I guess it won't take a mathematician to reckon them all up by the time the tournament is over. It's always that way before any important event; cars possessed of amazing speed seem to spring out of the earth, but somehow very few get as far as the starting line."

It is rumored that the special Stanley steamer built for the Florida tournament will not be entered, owing to a disagreement between the builders and Ross, who was to drive it. Much is expected of the machine in the way of speed, and if it does not appear on the beach there will be a good deal of disappointment among steam enthusiasts. Ross is the present holder of the Dewar cup for one mile, having won the trophy with his steam racing car at the last Florida beach tournament.

Arrangements for the Cuban road race, which takes place after the conclusion of the Ormond-Daytona beach tournament, are well under way, and entry blanks for the road race and the shorter races that will complete the program have been issued. The course will cover a 57-mile circuit of excellent roads and will probably be oiled, an appropriation of $5,000 having been made by the Havana city council for that purpose. The starting point will be seven miles nearer the city of Havana than was the start of the last Cuban road race, and will be within reach of the trolley lines. Camp Columbia, the American barracks, will be used for garages, training camps and residences by some of the visitors. Entry blanks for the Palm Beach auto-boat regatta have also been sent out by Mr. Morgan.

Detailed information and entry blanks for the Ormond-Daytona beach tournament, the Cuban races and the Palm Beach auto-boat regatta, may be obtained from W. J. Morgan, 116 Nassau street, New York.

Motorcycle Hour Record.

PARIS, Dec. 12.—A motorcycle record of 63.6 miles an hour has been made by Guippone at the Parc des Princes indoor track in Paris.

From a standing start, on a 12-horsepower Peugeot motorcycle of 90 mm. bore and 100 mm. stroke, the first ten kilometers were covered in 5:34 4-5. Fifty kilometers (31 miles) were covered in 29:01 3-5, and in the first half hour 32.024 miles were accomplished. One hundred kilometers (62.1 miles) were accomplished in 58:38 1-6, and the same speed was maintained until the sixty minutes had elapsed, when a total distance of 63.609 miles was covered.

The Parc des Princes track on which the record was made is good up to a mile-a-minute speeds, but beyond this it is dangerous, and the performance is therefore all the more to the credit of both driver and machine.

For a long time the Peugeot firm has been preparing for this record, and minute attention was given to every detail of construction of the machine. The motor is the one which won this summer on the Dourdan Circuit, but the frame was especially constructed to resist the enormous strain to which it would be subjected. The belt and tires, too, were of special construction, the latter being by Lion-Wolber. An average speed of just over seventy miles an hour was the rate on the fastest round, the track measuring just 137-1,000ths of a mile in circumference a yard from the pole.

The old record belonged to Anzani, who covered 58.27 miles in the hour.

Bluish colored rubber is used in France for floor mats in automobiles because it does not show the stains of grease, oil and dirt as white rubber does.

Grand Prix for 1906.

PARIS, Dec. 14.—No time has been lost by the Automobile Club of France in making arrangements for the big road race next year. The event has not yet been named, but popular opinion has christened it the "Grand Prix," though some would prefer the title of "World's Championship," in view of the fact that the club desires it to be the most important race of the whole world. At a meeting of the Sporting Commission held yesterday it was decided, after a long discussion, that all repairs or changes of tires must be done by the driver and his mechanic; the filling of gasoline, water or oil tanks, as well as all changes of spare parts, must also be done by the driver and mechanic. Repair stations and gasoline stores can be established around the circuit as heretofore, but none but the two men on the car will be allowed to touch it for any cause whatever from the start to the end of the race; commissioners will be stationed at each post to see that this regulation is faithfully carried out. The number of cars for each factory has been fixed at four, but the commission retains the right to reduce this number to three if engagements are very numerous. In every case not more than four cars in all will be allowed different firms constructing the same car under license.

It is very probable that a circuit in the forest of Fontainebleau, about thirty miles south of Paris, will be chosen for the big race. The Sporting Commission has considered the proposal at its last meeting and decided to visit the district next Sunday. Should the circuit appear suitable, it will be at once selected, and formalities immediately entered upon to secure it for the race. Other likely circuits are Ardennes, the Auvergne, and the Aix-les-Bains. The 1905 Gordon Bennett circuit is not very popular on account of the heavy expense that would be entailed in reconstructing grand stands and foot bridges in a mountainous country miles from any town. Aix-les-Bains would necessitate neutralizations, and the Ardennes are a long way from Paris.

Fontainebleau has everybody's favor; the roads are hard and well made, wide and straight, and include two or three hill climbs. Starting just outside the interesting old town, the road runs northwards through the forest towards the town of Melun, bends back on itself and, after branching off towards the west, arrives again at Fontainebleau. From this point it makes a triangular run to the southwest of the town, and after this a short circular run to the southeast. The total distance is about fifty-three miles through the most magnificent forest land in all France; there would be no grade crossings and neutralizations whatever. The center of the circuit would be Fontainebleau standing in the middle of the forest of the same name, and the circuit really consists of three circuits starting from this common center.

At the points where the road crosses itself there is sufficient space to construct barriers so as to divide the meeting places into individual tracks. Being so near the capital, enormous crowds would witness the race, and it is proposed to cover the expenses by making a charge to approach the road. As most of the land belongs to the government, this would be quite possible.

The date of the Grand Prix race will be between June 15 and July 25, and the entrance fee will probably be $1,000 for each car.

There is every danger of the Tire race being killed by the Grand Prix. Officially the three events—Tire race, European circuit and Grand Prix—are to constitute the club's program for 1906, but enthusiasm in the first named event has dropped down to zero and nobody would be surprised if it were abandoned entirely.

Short Drives in New Jersey.

NEWARK, Dec. 26.—The weather this fall and early winter has been so extraordinarily mild and dry that automobilists have been able to use their cars for pleasure riding uninterruptedly up to the present time. There has been so little cold weather that the frost has not injured the macadam roads to any appreciable extent, and both metropolitan motorists and those residing in Newark and the Oranges have been seen on the roads in large numbers.

Because of the poor approaches to Newark—over the turnpike and the plank road across the Jersey meadows—many New York automobilists are deterred from venturing into this territory, but those who cover the uninteresting strip separating Newark from Jersey City find themselves amply repaid when they reach Newark and begin to glide over the smooth thoroughfares that stretch out in every direction in Union, Morris and Essex counties.

The trip to Morristown is as popular a drive as any at this season of the year. That city, said to represent more wealth than any other municipality of its size around New York, can be reached in two ways: One route is along Broad street, Newark, into which both the turnpike and plank road lead, to Clinton avenue as far as Irvington, at which place one should follow Springfield avenue to Milburn.

A mile or so west of Milburn the fine macadamized Morristown turnpike crosses Springfield avenue. This road runs through both Union and Morris counties, and takes the automobilist into Chatham, Madison and Convent. Hobart's Hill, a steady incline that can be taken quite easily on the high gear, is the only elevation of any consequence to be met with on this run.

Or one may go to Elizabeth by way of Frelinghuysen avenue, and follow Morris avenue to Springfield, where the road merges into the Morristown pike.

From Morristown one may drive on to Dover or Lake Hopatcong, or south to Mendham and Bernardsville. The roads to all three places have been in prime condition this season, and the run to Bernardsville is interesting to those with a liking for architecture because of the many costly suburban residences to be seen along the way.

Another pleasant trip is to Plainfield by way of Elizabeth and Westfield. The best road is Morris avenue, which should be followed as far as the old historic Meeker Inn, where a turn to the south should be made. A stop off at Baltusrol, where golf links renowned all over the country are located, may be made. Many local autoists have this fall taken the trip to Montclair, Caldwell and Whippany, and then gone on to Bernardsville. There are several good lunching places on this route as well as repair shops.

Morris county has borne an unsavory reputation among automobilists because in the past the county officials have seen fit to enforce the speed regulations so rigorously that their action has amounted to persecution. It is said that more tolerance is now being shown.

The ride to Trenton, and then on to Camden, can now be taken over one continuous stretch of macadam, the completion of the New Brunswick-Franklin Park road and the Kingston extention having made that possible. The two gaps were all that interrupted an almost continuous stone road from this city to Camden by way of Elizabeth, Rahway, New Brunswick, Franklin Park, Princeton and Trenton. There is now a stone road direct to Princeton which shortens the distance between New York and Philadelphia. It is no longer necessary to go to Trenton by way of the Cranbury turnpike.

New York leads in the number of automobiles as evidenced by the fact that from 1901, when the present law went into effect until the first day of November, more than 23,000 automobiles were registered with the Secretary of State, the registration fees at $2 each amounting to $46,000. It has long been the cry of automobilists opposed to this form of taxation that they would not object to $5 or even $10 a year, provided all the money went for road improvement.

Hotel proprietors who wish to be up-to-date must include as a part of their equipment one or more automobiles which can be placed at the disposal of their guests. In all of the large summer resorts steps have been taken to secure such vehicles, and automobile parties are expected to be the fashion next summer. At many of the winter resorts along the coast of Florida, where fine roads stretch for miles along the shore, a fully equipped automobile has become almost a necessity if one expects to be in style.

Mogg—"Did you come all the way on your direct drive?"

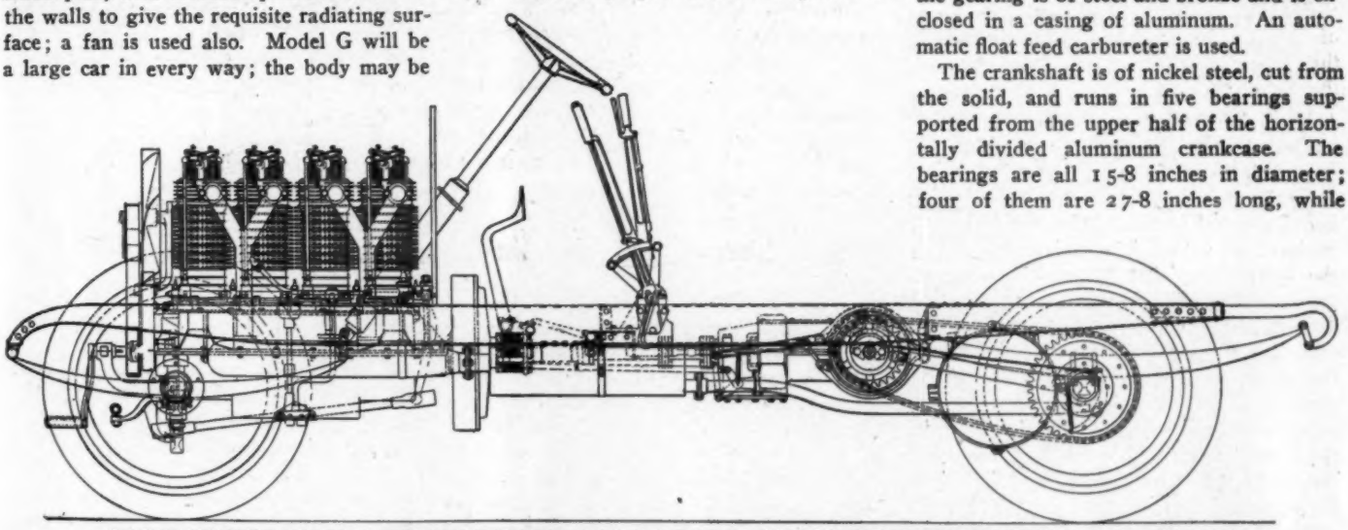
Boggs—"No. We came by a roundabout route."—*Motoring Illustrated.*

Knox Air-Cooled Motor-in-Front Car.

A NEW high-powered touring car with a vertical air-cooled motor in front will be the most interesting of the 1906 pleasure cars manufactured by the Knox Automobile Company, of Springfield, Mass. The new machine, which will be known as Model G, will have a four-cylinder engine rated at no less than 35-40-horsepower, the cylinders being built after the well-known Knox plan, with threaded pins screwed into the walls to give the requisite radiating surface; a fan is used also. Model G will be a large car in every way; the body may be a straight-line tonneau, a *Roi des Belges*, or a limousine, the chassis being the same in all cases. With touring body the car will weigh approximately 2,800 pounds; the distance between the axles will be 112 inches. The tonneau will seat five persons—three in the regular rear seat and two on folding seats facing backward, giving a total seating capacity of seven persons. The limousine will carry six passengers, the closed body having seats for four. Transmission is by sliding gears, giving four speeds forward and a reverse, all controlled by a single selective lever; drive is by side chains. Practically all bearings, except those in the motor proper, are imported non-adjustable ball bearings.

The four-cylinder motor has separately cast cylinders to permit the insertion of the characteristic Knox threaded pins. Valves are mechanically operated and are placed in the cylinder heads; they are all 2 inches in diameter, all alike and interchangeable, forged from a special grade of nickel steel, each valve a single piece. Each valve is set in a cage which may be removed without disturbing any other parts by unscrewing a single nut. The exhaust valves have a lift of 3-8 inch and the inlet valves 1-4 inch. Two camshafts are used, one on each side of the engine. The one on the right-hand side carries the inlet cams and the other the exhaust cams; long push-rods extend upward from the cams and operate the valves through rocker arms pivoted on brackets attached to the cylinder heads. Each camshaft runs in three bronze bearings lubricated from the crankcase; a cast aluminum cover over each camshaft may be taken off by removing the holding down bolts, and the camshafts may be removed through the openings thus provided. The inlet camshaft carries the gear for driving the magneto employed to furnish the ignition current; the gearing is of steel and bronze and is enclosed in a casing of aluminum. An automatic float feed carbureter is used.

The crankshaft is of nickel steel, cut from the solid, and runs in five bearings supported from the upper half of the horizontally divided aluminum crankcase. The bearings are all 1 5-8 inches in diameter; four of them are 2 7-8 inches long, while the fifth, at the flywheel end, is 4 inches long. Crankpin bearings are 1 3-4 inches in diameter and 2 1-2 inches long. Pistons are 6 inches long and are fitted with three packing rings each. Hardened steel is employed for the piston pins, which are 1 inch in diameter and afford a bearing 2 1-2 inches long for the piston end of the connecting rod; the pins are hollow. The bearings at both ends of the connecting rods are of bronze; the rods are 11 inches long from



CHASSIS OF KNOX MODEL G, SHOWING VERTICAL ENGINE AND SIDE CHAIN DRIVE FROM DIFFERENTIAL COUNTERSHAFT.

KNOX MODEL G STRAIGHT-LINE TOURING CAR, WITH 35-40-HORSEPOWER FOUR-CYLINDER VERTICAL AIR-COOLED ENGINE IN FRONT.

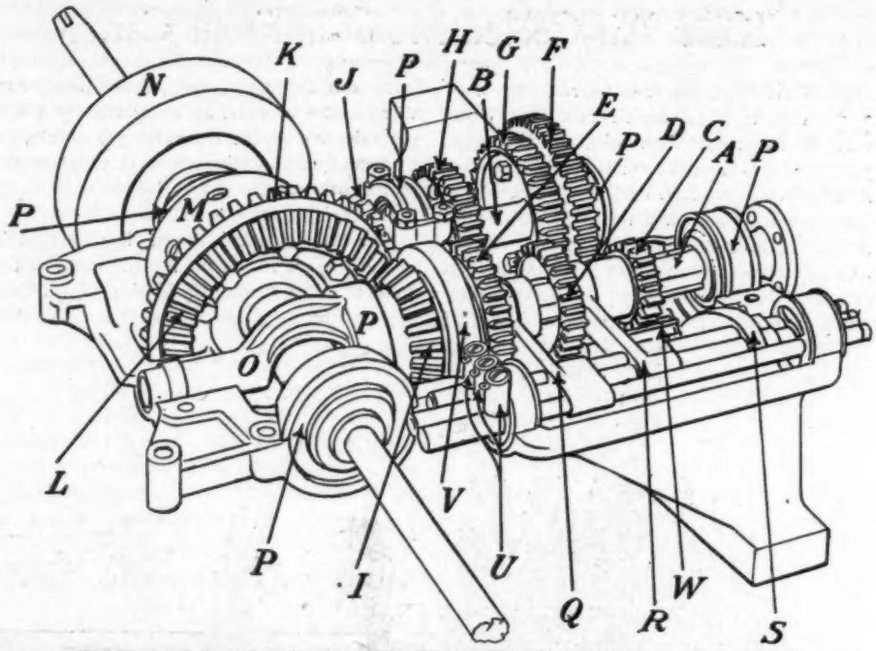
center to center. The cylinders have a bore of 4 3-4 inches and a stroke of 5 1-2 inches.

The jump spark ignition system includes a low tension magneto, the current from which is passed through a coil to induce the high-tension current required to jump the gaps between the sparking points of the plugs; a secondary distributer, which forms part of the magneto, sends the current to the plugs in rotation. The magneto is driven by spur gearing from the inlet camshaft. A battery of dry cells is carried as an auxiliary source of current supply.

Four arms are cast one on each corner of the upper half of the crankcase, and by these the motor is supported directly on the main side frames of the car. The lower half of the crankcase is removable and is subjected to no stress when in position.

The clutch is of the cone type, but differs from the majority of cone clutches in having metal-to-metal friction surfaces and in being enclosed in an oil-tight casing attached to the flywheel, so that the clutch runs constantly in oil. The manufacturers state that it is practically impossible to "jump" the car with this clutch, as the film of oil between the surfaces prevents a too sudden engagement. There being little chance for leakage, only a small quantity of oil need be placed in the clutch casing each week.

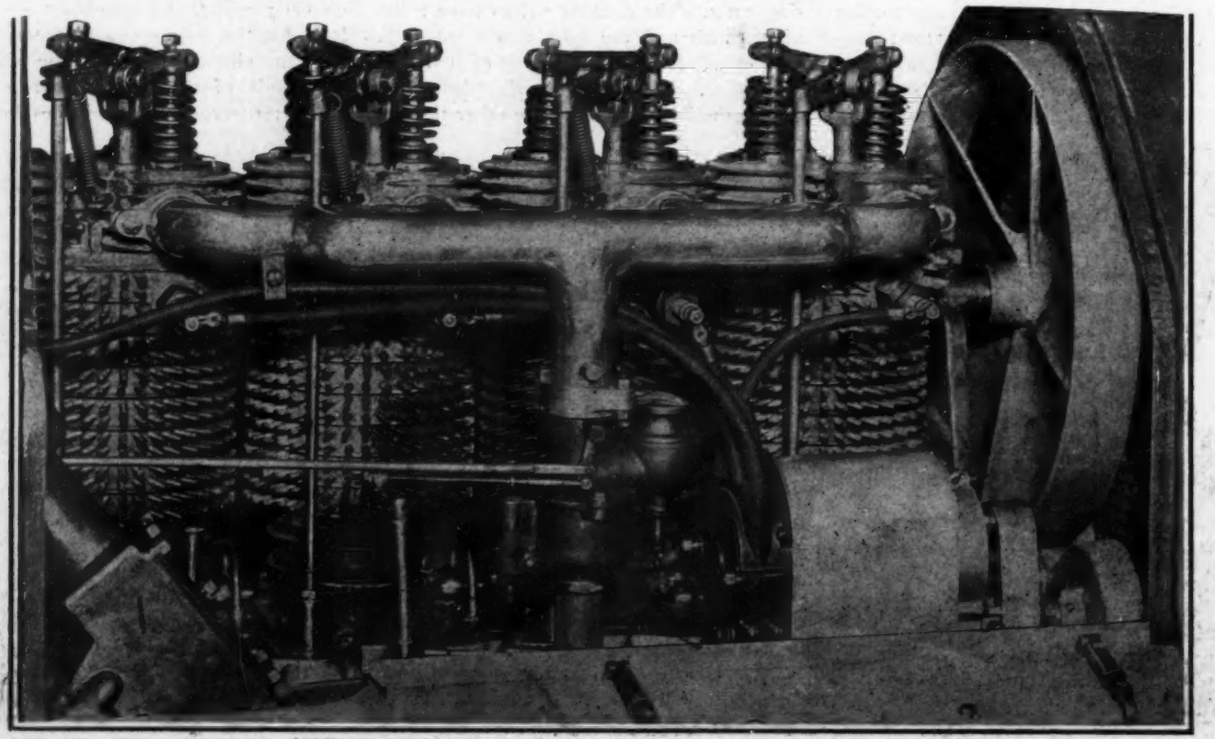
A sliding gear transmission, of the selective type, gives four forward speeds and one reverse. Non-adjustable ball bearings are used throughout the transmission. The shafts are of nickel steel having a tensile strength of 120,000 pounds to the square inch, while the gears are of chrome nickel steel with a tensile strength of 175,000 pounds to the square inch. The aluminum gearcase is horizontally divided at the center, and the upper half is fitted with removable covers.



KNOX FOUR-SPEED SLIDING GEAR TRANSMISSION AND BEVEL GEAR DRIVE.

A, Primary shaft with four feathers. B, Secondary shaft. C, Sliding gear giving first speed when meshed with F. D, Gear giving second speed when meshed with G. E, Gear giving third speed when meshed with H. Drive on first, second and third speed is through bevels J and K, bevel I running idle. For direct drive, E slides into an internal gear cut in V, the latter being integral with bevel I. On direct drive shaft B and its gears run idle, only the bevels being in mesh. L, Bevel gear for high-speed drive. P P P P P P, Non-adjustable ball bearings. W, Reverse pinion, meshes with C and F when in operation. Q, R, S, Shifting forks secured to shifter bars. U, Casing containing balls pressed by springs into notches in shifter bars to hold gears in or out of mesh. O, Brace for ball bearing for pinion I. M, Differential casing. N, Drum for service brake.

A feature of the Knox transmission gear is that the usual divided shaft, with one part running in a bearing formed within the other part, is not used, both primary and secondary shafts being solid from end to end, short, stiff and of good diameter. The drive is direct on the high speed. There are two bevel gears placed back to back on the jackshaft; one is permanently meshed with a bevel pinion on the secondary shaft and is used for first, second and third speeds and reverse. The other meshes with a pinion containing the clutch for the high-speed drive, and is used for the high speed



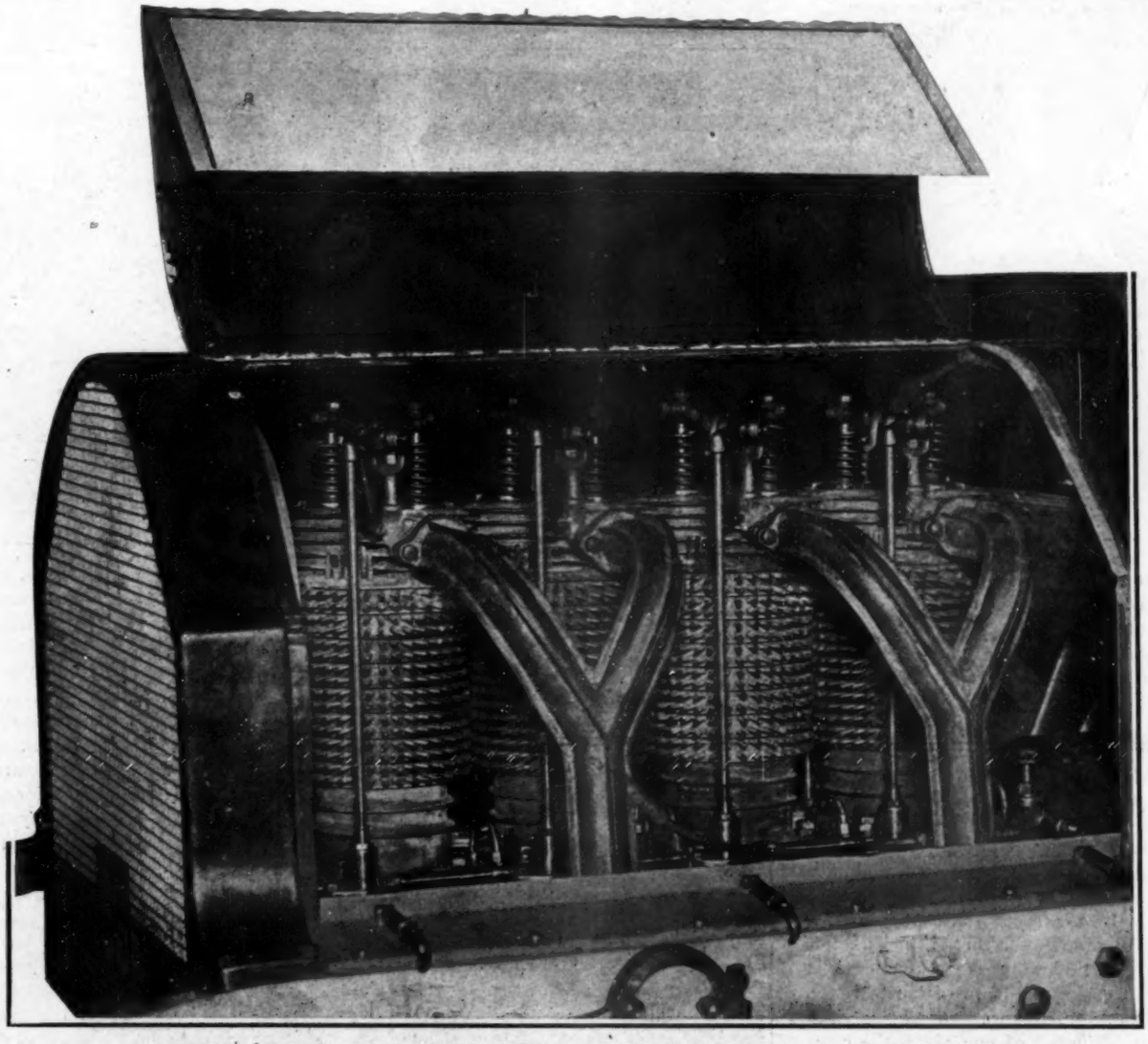
INLET SIDE OF KNOX ENGINE, SHOWING CARBURETER, SPARK PLUGS, MAGNETO AND VALVE RODS.

only, the secondary shaft revolving idly when the high speed is engaged. By means of a locking device the gears not in use are securely held against movement, only the gear with which the hand lever is connected being free to slide. The differential, of the bevel gear type, is enclosed with the bevel gears driving the jackshaft in a rearward extension of the gearcase; tubular lateral extensions of the gearcase enclose the jackshaft and carry at their outer ends the non-adjustable ball bearings of the sprockets from which the side chains run.

Steering gear is of the screw and nut type, heavily made, with large wearing surfaces; the connections are hand forged from nickel steel, and the joints are of the ball-and-spring pattern, covered by leather casings. Throttle and ignition levers are mounted over the steering wheel, while a pedal accelerator is fitted.

The side members of the pressed steel frame are without offset; they are five inches deep, 1 1-2 inches wide and 5-32 inch thick at the center, tapering toward each end to meet the spring horns, which are semi-elliptic, 2 inches wide; those in the rear are 54 inches long, while the front springs are 42 inches long. Wheelbase is 112 inches and tread 56 inches, standard width.

The lubrication of the engine is accomplished by a special system which, the manufacturers state, gives better results than the splash method. A rotary oil pump, driven by spiral gears from the exhaust camshaft, is located in an oil well in the bottom of the crankcase of the engine, and from this pump leads carry the oil to all bearings of the motor, including the crankpins; the hollow



EXHAUST SIDE OF KNOX 35-40-HORSEPOWER FOUR-CYLINDER VERTICAL AIR-COOLED ENGINE.

For regular service braking there is a metal-to-metal band and drum brake on the differential, enclosed in the same casing with the gears; this is operated by a push-pedal. The emergency brake is of the internal expanding type, the shoes working in drums attached to the rear hubs, and is applied by a hand lever. The brakes are substantially proportioned, and either is sufficiently powerful to slide the wheels of the car. The foot brake can be disconnected from the clutch by the removal of one bolt, so that those who desire to brake with the engine may do so.

hand forged from the same grade of nickel steel that is used for the axles. The axles are forged from nickel steel of 120,000 pounds tensile strength, and are both of I-beam section 2 inches deep and 1 1-2 inches wide. Each is forged from a single piece of steel, and after forging is oil tempered and annealed. The steering pivots and levers are forged in one piece from the same steel.

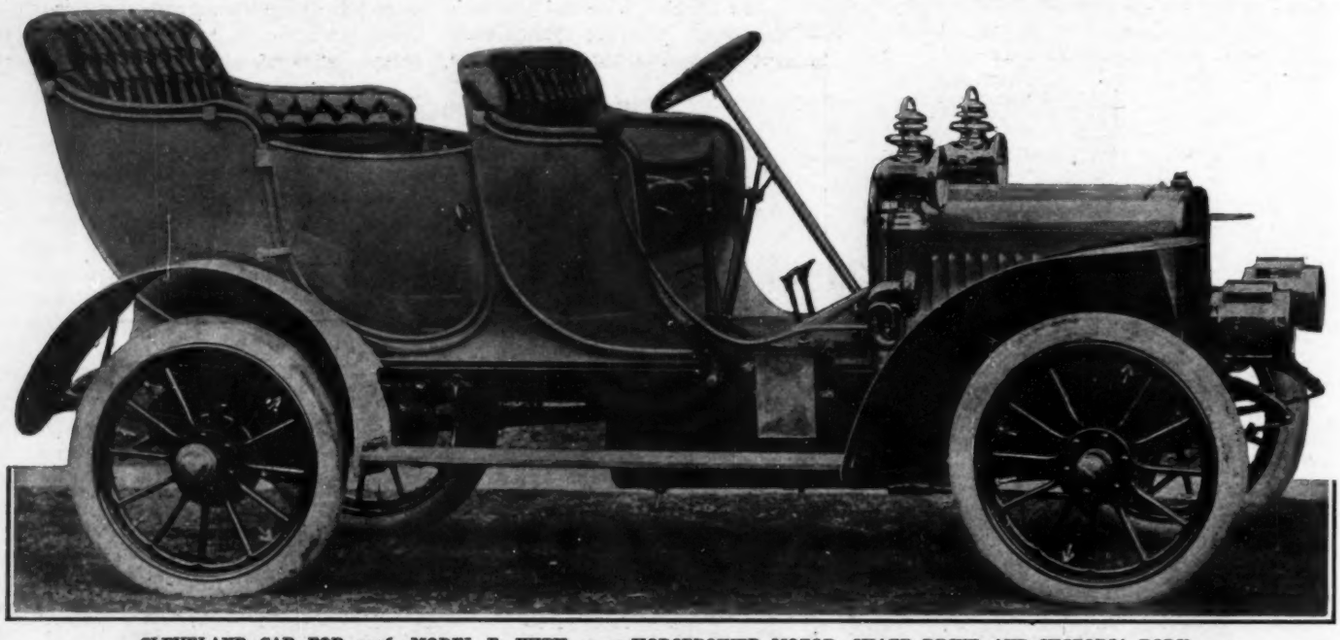
The wheels are 34 inches in diameter and, as has already been stated, run on non-adjustable ball bearings. The rear wheels are fitted with 4 1-2-inch tires and 4-inch tires are used in front. All the springs are

connecting rods are employed to convey oil to the piston pins and to the cylinder walls. The pump is of such size that a considerable excess of oil is raised; the surplus runs from the bearings back into the oil well, where it is strained and again taken up by the pump and so kept in circulation. A pressure indicator and a pressure regulating valve for the lubricating system are placed in plain sight on the dashboard, so that the pressure of the oil feed may be adjusted by the driver.

The new Knox car will be exhibited at the Madison Square Garden show.

Cleveland 30-35 Horsepower Model F.

FOR the season of 1906 a practically new model will be placed on the market by the Cleveland Motor Car Company, of Cleveland, O., under the designation Model F. The new machine will be a four-cylinder touring car of 30-35 horsepower, and will retain a number of features that gave satisfaction in the 20-horsepower car built by the company for 1905.



CLEVELAND CAR FOR 1906, MODEL F, WITH 30-35-HORSEPOWER MOTOR, SHAFT DRIVE AND VICTORIA BODY.

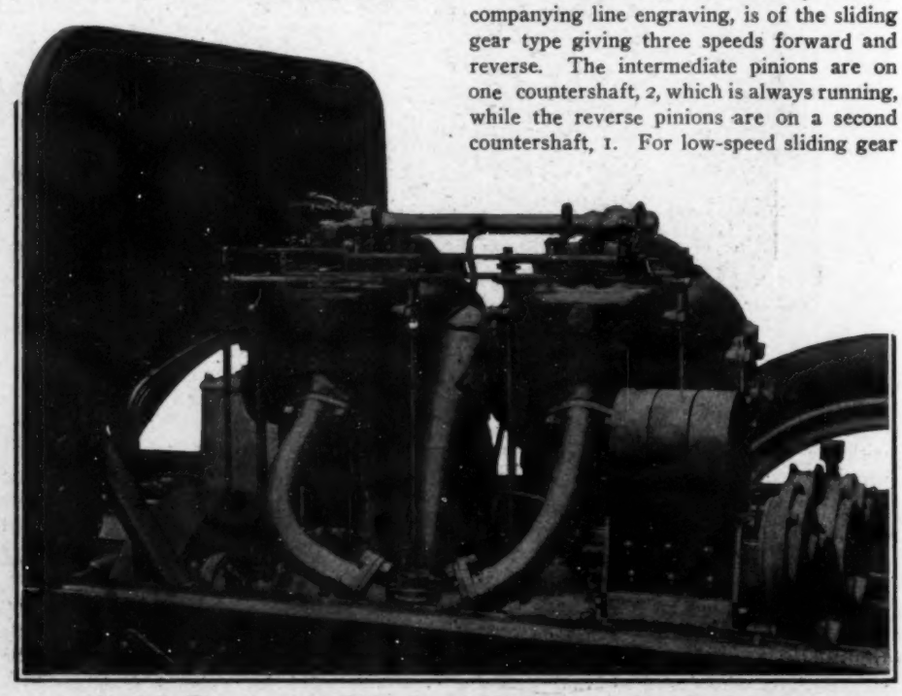
Among the important changes is the adoption of the Simms-Bosch low-tension magneto with make and break spark in place of the jump spark ignition used last year. The spark is obtained by interior make and break, and the igniters are held in the cylinder by a single nut each. The igniter points are of imported nickel alloy such as is used in foreign cars which employ this system of ignition. A feature of this system is that the ignition timing is taken out of the operator's hands and is regulated by the speed of magneto which is geared to the motor through a half-time shaft. The timing gears are enclosed in aluminum casings and are of hard bronze. All valves are mechanically operated. Each camshaft is forged of one piece, the cams being forged integral with the shaft itself; cams are case hardened and the rollers which operate the lifting rods are also case hardened. The cams are of generous proportions and practically noiseless. The connecting rods are of nickel steel and are hardened at the piston ends, the piston pins also being hardened and secured in the piston by means of a spring washer fitting into a groove in the piston ring. The brasses on the crank pin ends of the connecting rods are of special bearing metal and have large bearing surface.

The circulating system consists of a honeycomb cooler and the water is positively circulated by a centrifugal pump mounted directly on the engine and driven by a gear from the exhaust camshaft; a cooling fan is mounted on a bearing bolted to the front cylinder and is driven by a leather belt from a camshaft pulley. A Hill precision oiler lubricates all the bearings in the engine and transmission, besides furnishing a surplus of oil which is used for the splash lubrication of the cylinders.

Uniformity of the quality of gas supplied by the carbureter is secured by fitting the carbureter with an auxiliary air inlet; permanent adjustment is made by means of a valve, after which the carbureter takes care of itself, so far as the quality of the mixture is concerned. The throttle is part of the carbureter, and is controlled by a lever on the steering wheel, independent of the ignition timing.

The clutch is an aluminum leather-faced cone fitting into a recess in the flywheel. The spring which gives the clutch its grip is so arranged that no thrust is transmitted to the engine bearings. A universal joint connects the clutch to the transmission, preventing undue wear to the engine and transmission bearings due to the possibility of the members being temporarily out of alignment.

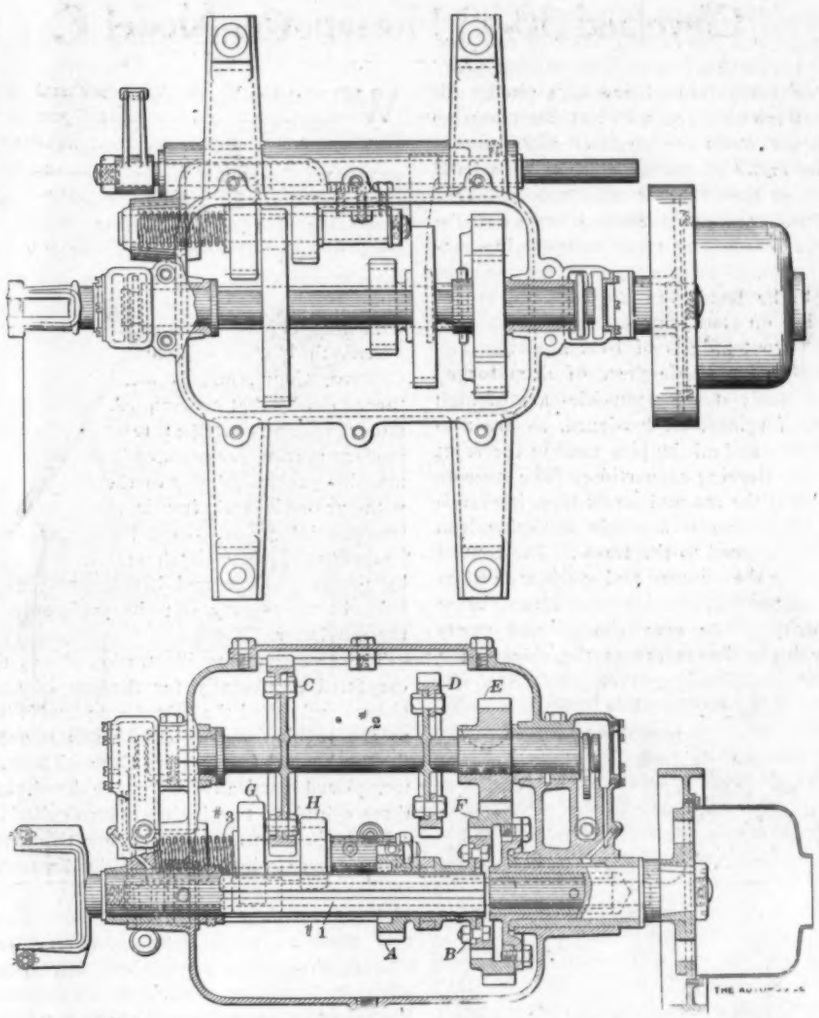
The transmission, illustrated by the accompanying line engraving, is of the sliding gear type giving three speeds forward and reverse. The intermediate pinions are on one countershaft, 2, which is always running, while the reverse pinions are on a second countershaft, 1. For low-speed sliding gear



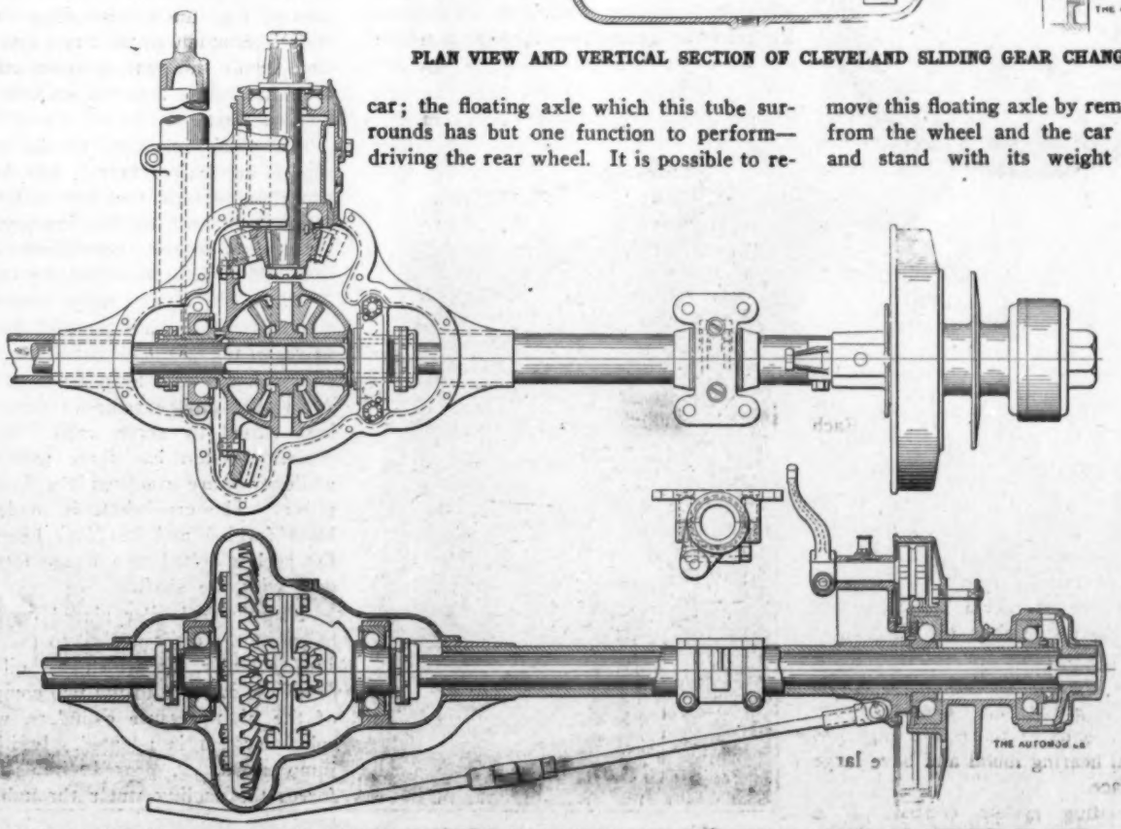
CLEVELAND 30-35-HORSEPOWER MOTOR SHOWING LOW-TENSION MAGNETO.

A passes into mesh with gear *C*, which drives the main driving gear *F* through the countershaft driving gear *E*. For the second speed, gear *B* passes into mesh with countershaft gear *D*, which drives in the same way. For the third speed sliding gear *B* engages with an internal gear cut in *F*, which connects the crankshaft and propeller shaft as one. For the reverse, sliding gear *A* passes into mesh with reverse pinion *G*, which operates on the reverse pinion countershaft; at the same time reverse pinion *H* engages with countershaft gear *C*, reversing the direction of *C*, and consequently reversing the driving mechanism. The shafts and gears are all of high carbon steel and are oil tempered; the bearings are also of high carbon steel, hardened and ground and equipped with oil rings. The driving pinion *E*, which is always in mesh, is pinned and keyed to its shaft. The hubs of all other gears are forged integrally with the shafts and the gears are bolted to them. The gearcase is of aluminum and is provided with a large hand hole for examination and initial lubrication of the gears and shafts.

The propeller shaft is equipped with two cardan joints and is made of high carbon steel; the pins are oil hardened and the sliding joint at the rear end of the shaft is of generous dimensions. The rear axle is bevel gear driven and is of the well-known hub clutch type. The exterior tubes upon which the rear wheels revolve are hardened and ground and carry the weight of the car; the floating axle which this tube surrounds has but one function to perform—driving the rear wheel. It is possible to remove this floating axle by removing the hub from the wheel and the car will still roll and stand with its weight on the rear



PLAN VIEW AND VERTICAL SECTION OF CLEVELAND SLIDING GEAR CHANGE SPEED.



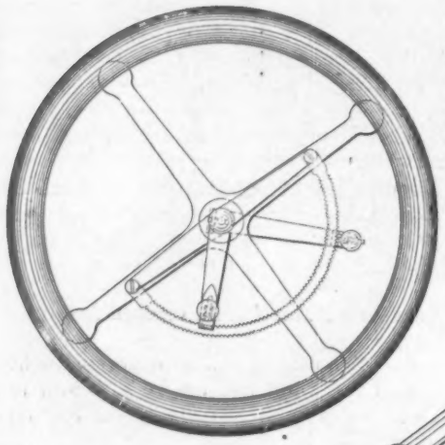
CLEVELAND REAR AXLE, PARTLY IN SECTION, SHOWING BALL-BEARINGS AND DRIVE TO OUTSIDE OF HUB.

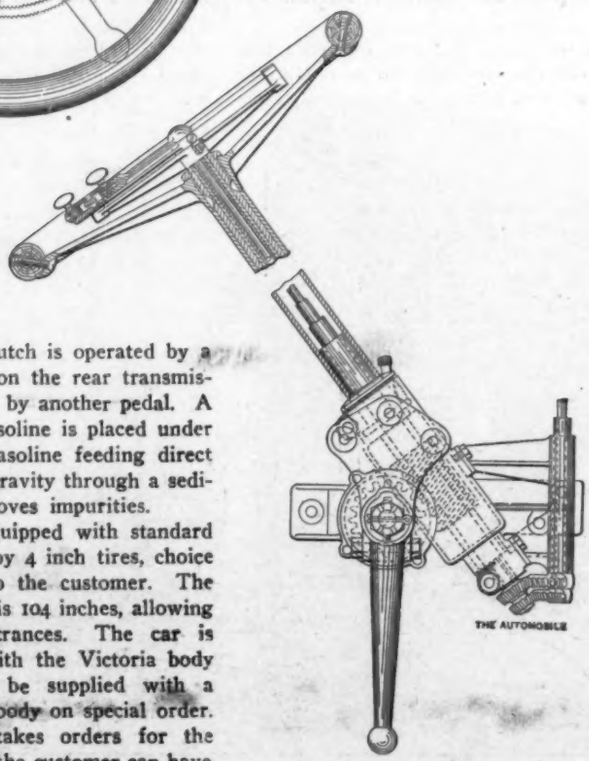
wheels. The differential is mounted on ball bearings and the driving shaft is equipped with similar bearings. The driving gears are unusually large, being of 4 pitch. All wheels are equipped with ball bearings; the races and cones are hardened and ground.

The brake equipment consists of a band brake on the propeller shaft actuated by a foot pedal and the emergency brakes, of the internal expanding type, enclosed in dust-proof casings on the hubs of rear wheels. The brake bands are of phosphor bronze working on steel drums.

The front axle is of I-beam section and is made of a single piece of drop forged nickel steel; steering knuckles are of high carbon forgings, oil hardened, as are also the pivots and all the pins used in the front axle and steering connections. The steering gear is of the nut and screw type, irreversible; the casing is a single malleable iron casting fastened to the frame. The control levers for the mixture and spark are on top of the steering wheel, the quadrant being stationary. The gear change and emergency brake levers are at the side of the driver's seat. The clutch is operated by a pedal and the brake on the rear transmission shaft is operated by another pedal. A 14-gallon tank for gasoline is placed under the front seat, the gasoline feeding direct to the carbureter by gravity through a sediment trap which removes impurities.

The wheels are equipped with standard clincher rims for 34 by 4 inch tires, choice of tires being left to the customer. The wheelbase of the car is 104 inches, allowing spaces for wide entrances. The car is equipped regularly with the Victoria body illustrated, but will be supplied with a double phaeton tulip body on special order. The company also takes orders for the chassis alone, so that the customer can have a body built to suit his individual tastes.





STEERING MECHANISM AND ENGINE CONTROL OF CLEVELAND CAR.

Compound Car for Physicians' Use.

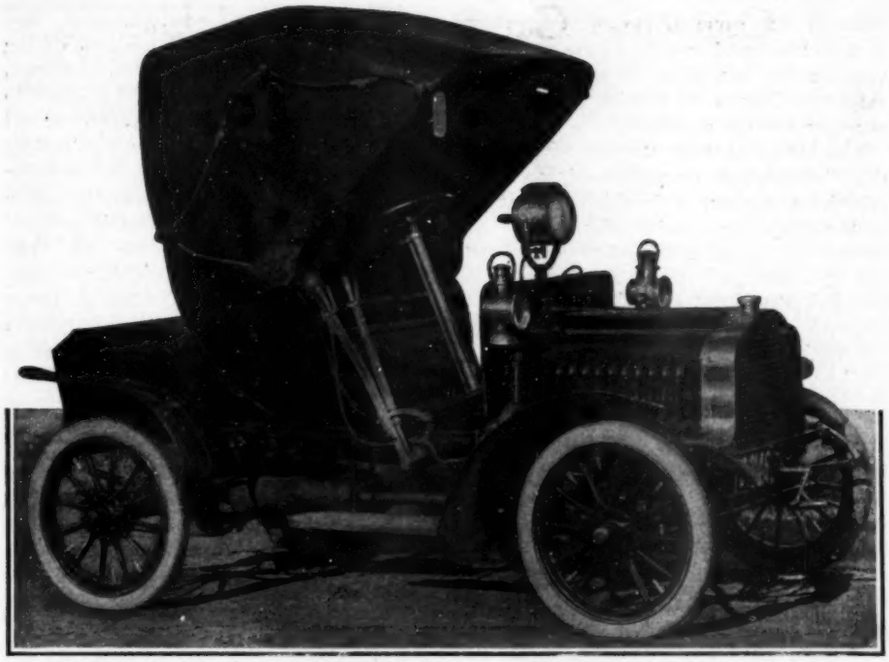
WITH the exhaust from gasoline motors issuing from the cylinders at a pressure which, in many cases, reaches forty pounds to the square inch—a pressure that represents so much wasted energy—it is not surprising that serious efforts have been made to utilize this energy by compounding the gasoline engine, much as the steam engine is compounded. An engine designed with this object in view is built by the Eisenhuth Horseless Vehicle Co., of Middletown, Conn., and is fitted to the cars turned out by that concern. Apart from the motor, which is rated at 12-15 horsepower, modern touring car practice is followed, the machine generally being of the foreign type with pressed steel framing, sliding gear transmission giving three forward speeds, leather-faced cone clutch and drive either by propeller shaft and bevel gears or by side chains, as may suit the preference of the purchaser.

The accompanying illustration shows the car fitted particularly for the use of physicians and called the "Dr. Compound"; but as the regular touring car chassis is used, the mechanical features are alike. The motor, placed vertically under the hood, has three cylinders, two high-pressure cylinders 4 inches in diameter and, between them, one low-pressure cylinder 7 inches in diameter; the stroke in all cases is 4 inches. The high-pressure cylinders are of the usual type used in gasoline motors, having mechanically operated valves, both located on the right-hand side; but instead of exhausting into the atmosphere through a muffler they exhaust into the low-pressure cylinder. The high-pressure cranks are both on the same side of the crankshaft and the low-pressure crank is on the oposite side—in other words, the two high-pressure cranks are set 180 degrees from the low-pressure crank. The explosion cylinders fire alternately. At the beginning of each exhaust stroke a valve opens and permits the exhaust gases to pass into the large cylinder, where they drive down the piston and are expanded to a low terminal pressure and finally escape into a small muffler, the temperature and, of course, the pressure being much lower than on leaving the small cylinder. Each high-pressure cylinder exhausts into the low-pressure cylinder, and as the exhausts alternate, there is an impulse every half revolution, as in a four-cylinder motor of the usual type—that is, there are two explosions and two low-pressure impulses every two revolutions of the crankshaft.

Mechanical balance of the reciprocating parts is obtained by counterweighting the high-pressure cranks to balance the extra weight of the large low-pressure piston. The manufacturers state that, having only two explosion cylinders, there are fewer parts and consequently less liability to trouble than where four explosion cylinders are used; that the impulses in the low-pressure cylinder are exceedingly even throughout the stroke, giving the motor good torque at low speeds and excellent hill-climbing ability; that the compounding feature results in economy of fuel; and that the gases have ample time for complete combustion, with the result that the exhaust is clean and odorless.

The three cylinders of the compound engine are cast integral; the heads and water jackets of the explosion cylinders are cast integral, but the low-pressure cylinder has a separate head screwed in. The inlet and exhaust valves of the small cylinders are all on the right, operated by a single camshaft, while the inlet and exhaust valves of the large cylinder are on the opposite side, operated by a separate camshaft. All valves can be removed through openings closed by screw caps. Each high-pressure piston has three packing rings, while two are used on the low-pressure piston. The crankshaft is made from a hand forging and has four bearings; the flywheel is bolted to a flange formed integral with the shaft.

A mechanical oiler placed on the dashboard of the car sends oil to the low-pressure cylinder, in which an oil-retaining groove is cut, and to the two compartments of the high-pressure cylinders, where the splash system is adopted. Ignition is by jump spark. A geared circulating pump forces the cooling water through the system; the radiator is of the tubular type and is backed by a ball-bearing fan.



"DOCTOR COMPOUND" 15-HORSEPOWER CAR WITH STANHOPE TOP FOR PHYSICIAN'S USE.

The framing is of pressed steel, well braced at the corners, and the members are cold-riveted together. The front axle is tubular, dropped in the center; the Elliott steering yokes are pinned and brazed into the ends. The wheelbase is 82 inches and the tread 56 1-2 inches; the 28-inch artillery wheels are fitted with 3 1-2-inch tires. All springs are semi-elliptic and are 39 inches long. The rear axle is large and strongly trussed, and the differential is of the spur gear type. The standard chassis has bevel gear drive, but for 1906 side chain drive will be furnished when desired.

Three forward speeds and a reverse, with high speed direct drive, are controlled by a single lever; on the high speed the secondary shaft is thrown out of gear and does not rotate. A leather-faced cone clutch is fitted and is released by pedal. A pedal brake acts on a drum on the driving shaft, while the lever brake for emergency use acts on the rear hubs.

The body is of aluminum, whether of the touring type or of the special doctor's type illustrated; a large carrying space for luggage is provided.

In addition to the pleasure cars, the E. H. V. Co. is manufacturing a delivery wagon, as illustrated, embodying the compound motor, the motor being the same in every way as that used for the pleasure cars. The wagon has a wheelbase of 82 inches, with standard tread; the wheels are 28 inches in diameter and are fitted with 3 1-2-inch tires. A sliding gear transmission is used, giving three speeds and reverse, and drive is by propeller shaft and bevel gears.

Automobile salesmen are realizing more and more every day the truth and application of the adage that "the hand that rocks the cradle rules the world." The purchase of an automobile is usually discussed at some length in the family circle before the decision is made, and whether the machine be a runabout or a high-priced touring car, the wife's judgment often decides the question. Of late it has become a fad for society women to do their shopping in automobiles, and as a result the limousine and landaulet types of body are becoming very popular in the larger cities. Among the less wealthy the runabout or small electric that can be operated by a woman has found decided favor. Those companies making machines which can be operated safely and easily by women have found a new market, as has been shown by the great increase in their sales during the past year.

Howard 4-Cylinder Motor.

A four-cylinder vertical motor of 40-horsepower, for automobile work, is being manufactured by W. S. Howard, of Yonkers, N. Y., who will also turn out a motor for marine work built on the same general lines. In the automobile motor accepted foreign practice is followed in the general arrangement; the cylinders are cast in pairs with integral water jackets, heads and valve chambers; the mechanically operated valves are placed on oposite sides of the cylinders, inlet valves on one side and exhaust valves on the other. A comparatively recent idea is adopted in setting the valves at an angle of 45 degrees with the cylinders; valve guides are long and are annealed after being machined. In order that the relative positions of the valve seats and guides may be exactly correct, the seats are not finally finished until the guides are in position. The cylinders are ground to a plug gauge and the pistons are ground .004 smaller than the cylinders; the spaces between the grooves for the rings, however, are reduced 1-32 of an inch, so that these parts of the piston do not come in contact with the cylinder walls. There are four rings, one being placed near the bottom of the piston to wipe the surplus oil off the cylinder walls; the rings are lap jointed and are ground true on a magnetic chuck after being cut. The drop forged connecting rods are of I-beam section and are fitted with marine type big ends with bronze bushings, babbitt lined; the brasses are dovetailed together and held by two 1-2-inch nickel steel bolts. The piston pin is of hardened and ground steel, 1 1-4 inches in diameter, and the bearing surface is three inches long. The piston pin end of the rod is not bushed for the pin bearing, but is hardened and the hole lapped true. The two-to-one gears are enclosed;

E. H. V. COMPOUND CAR FITTED WITH A LIGHT DELIVERY BODY.

HOWARD 40-HORSEPOWER AUTO ENGINE.

the timer is geared to one of the camshafts and will be placed directly on the camshaft or on a gear-driven vertical shaft, as ordered. Cams are of hardened steel, as are the rollers in the push-rods. The aluminum crankcase is split horizontally and the upper half carries the three main bearings, the lower half, which is removable without disturbing other parts of the engine, serving as an oil container and dust shield. The crankshaft is made from a steel forging; the crankpins are hollow and serve to carry oil to the pins, as well as to lighten the shaft, and the slabs or cheeks are flat, with ends rounded and corners beveled off to save weight. The front end of the shaft is drilled out for the sake of lightness. A flange, formed integral with the shaft, is drilled with six holes to receive the fitted steel bolts used to attach the flywheel. Water circulation is maintained by a gear-driven gear pump. A carbureter of the Mercedes type is used, and is stated to be automatic in action.

In addition to the 40-horsepower motor, Mr. Howard will build a larger and a smaller engine, the same general features being retained. A chassis, fitted with 40-horsepower motor, will be built for the trade.

A GUIDE FOR SALESMEN.

Under the title "The Motor Car Dissected," the Winton Motor Carriage Company has issued a neat little book for the pocket which it is distributing among its agents. The book, which is bound in soft, black, fine-grained morocco leather, is written in the style of a direct talk with the agent. Opening with a catechism giving ten reasons why a prospective purchaser comes to the agent, it continues with a wide range of arguments and "points" for the use of the salesman in inducing a purchase of a Winton. Features of the car and its individualities in construction are dwelt upon, and also the various methods of testing materials and parts in the Cleveland factory. There are halftone illustrations of the Model K car, in the chassis and fitted with open phaeton body, with full leather folding top raised, and with limousine body. Each book has the name of the agent to whom it is sent stamped in gold on the cover and bears on the last page the autograph signature of Charles B. Shanks, general sales manager for the company.

This book makes an attrtctive way of putting the agent in possession of fresh and effective arguments with which to meet his customer and give useful information.

Expanding Band Clutch.

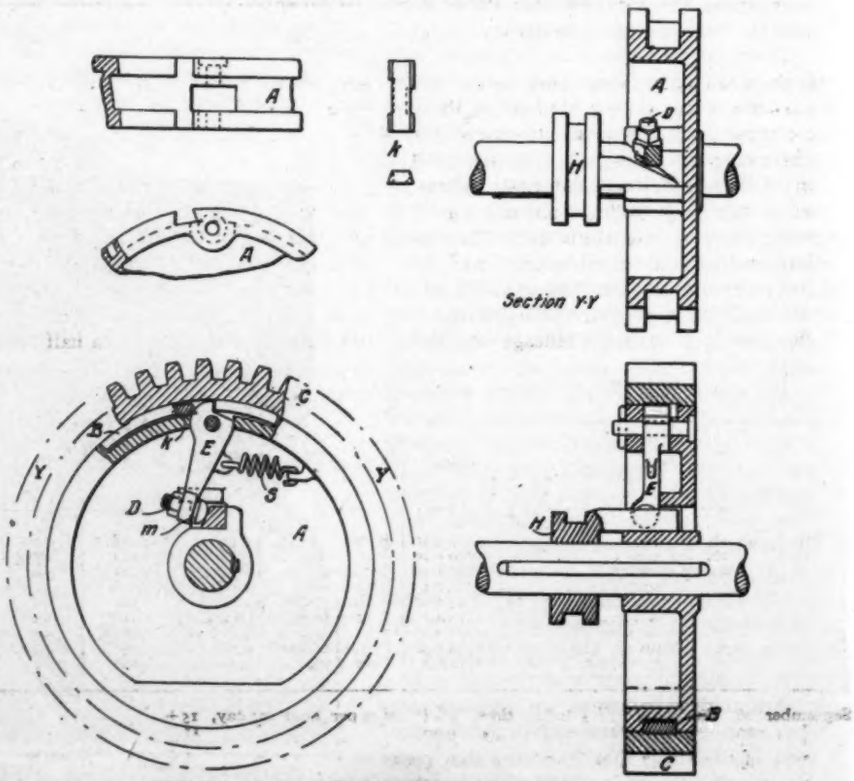
A clutch of the internal expanding band type, intended to run in oil, is shown in the accompanying line engraving, and was designed by H. B. Stitz, of Philadelphia, Pa. The clutch is shown mounted within a gear, though it is not necessarily arranged in this way; the flywheel of the motor could take the place of the gear without changing the construction of the clutch.

The wheel *A* is keyed to the shaft, and has in its rim an annular groove in which the split band *B* of springy steel is placed. The gear *C* is slipped over the edge of the wheel. It will be understood that if the ends of the split band *B* are forced apart the band will be pressed against the interior of the gear, as an internal expanding brake is pressed against the interior of its drum; the band, traveling with the wheel *A*, causes the gear and wheel to revolve together, provided sufficient force is applied to cause the requisite friction between the band and the interior of the gear.

The means for forcing apart the ends of the split ring are supplied by a collar *H*, of the type commonly used in clutches, sliding on the splined shaft. The collar is provided with a wedge-shaped extension, sliding in a guide formed in the hub of the wheel *A*. A lever *E*, fulcrumed, as shown, near the edge of the wheel, is adapted to produce a cam-like action, acting on one end of the split ring when the lever is shifted by advancing the wedge attached to the collar *H*; when the wedge is withdrawn the spring *S* brings the lever back to neutral position, and the natural spring of the split band withdraws it from contact with the gear. The round head of a bolt *D* takes the thrust of the wedge; by varying the thickness of the washer *M* the proper adjustment can be made. The outer end of the lever *E* acts on one end only of the band, the other end abutting on a key inserted in the edge of the wheel. The clutch is intended to run in oil, so that when first expanded the ring will slip sufficiently to give a gradual engagement the strength of which increases as the oil is forced from the friction surfaces.

An experiment was recently made by the Lacoste & Battmann works in France to see how long it takes to assemble a car. All the component parts of an 8-horsepower car were previously marked and at 6 o'clock on the morning of December 7 an official timer of the A. C. of France gave the word to start. At 9.48 A. M.—just 3 hours 48 minutes later—the car was completely erected and the engine running. At 10 o'clock Messrs. Lacoste, Rochet and Thomas started on a run to Bordeaux and back in the car.

A cracked cylinder jacket is the almost inevitable result of a combination of carelessness and cold weather.



DETAILS OF STITZ EXPANDING BAND CLUTCH.

Letter Box

Itinerary—Buffalo to New York.

Editor THE AUTOMOBILE:

[297.]—The following is a brief itinerary or log-book of an actual run from Buffalo to New York with a 35-horsepower, eight-passenger touring car:

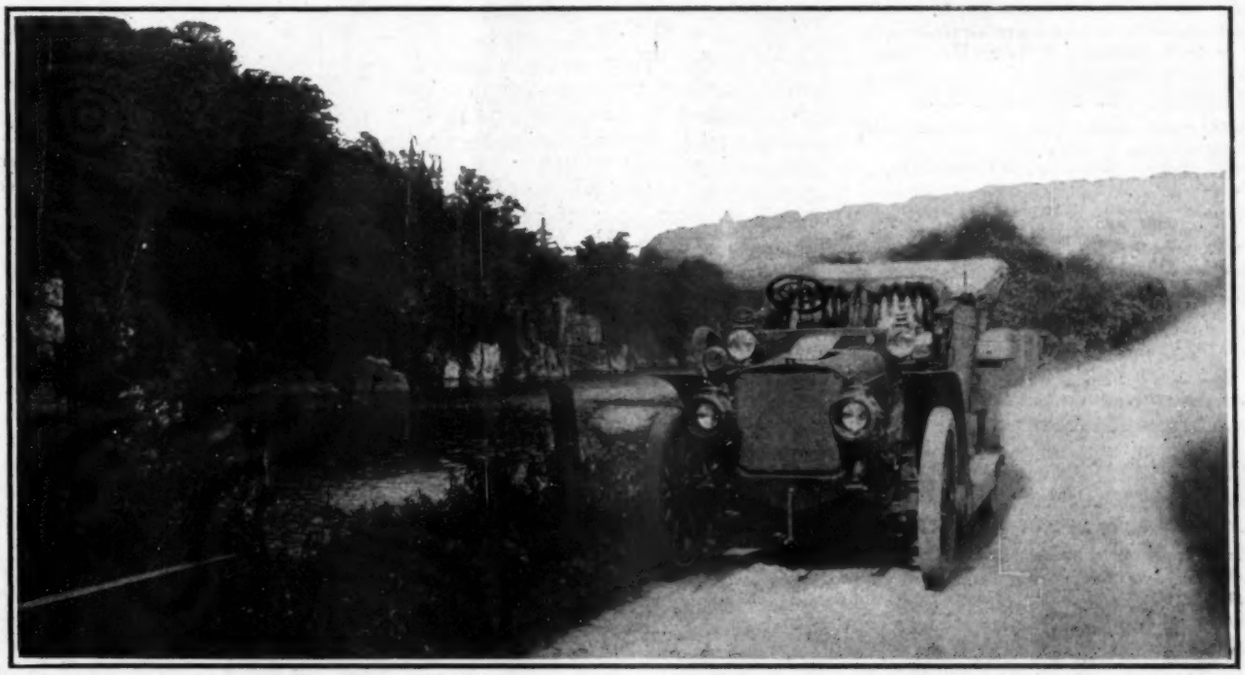
September 26. Cyclometer reading 1,341.5. Left Buffalo at 11 A. M. and arrived at Batavia, 37 miles, at 12.30 P. M. Roads for the first twenty miles level and good macadam, the remainder being fairly good and the last few miles rolling. Dinner at Richmond Hotel. Left Batavia at 2 P. M. for Rochester, 35.5 miles, via Bergen and Churchville Ridge Road and Lake avenue. Road mostly good, rolling; ten miles good macadam coming into Rochester. Had ignition trouble and changed battery. Arrived at Rochester at 5:15 A.M. Storage, Rochester Auto Company's garage. New Osborn Hotel, near the garage. Mileage for the day 72.5. Hours spent on the road 4.45. Mileage per hour, 16+. Weather fine.

September 27. Cyclometer reading 1,414. Started at 9 A. M., in the rain, for Savannah, 47 miles, arriving at 12.30; weather clear. Went around marsh. Roads fairly good and rolling all the way; some hills. Dined at Savannah and left at 1.30 P. M. for Syracuse, 35 miles. Reached Syracuse at 3.45 P. M., after a delay of thirty minutes, caused by having missed the road. Left at 5.15 for Utica, 68 miles. Ran to Verona before lighting the lamps; reached Utica at 8 P. M.; good road from New Hartford in. Stopped at Baggs' Hotel; storage, Miller-Mundy Auto Company's garage. Day's run, 150 miles. Hours on the road, 10. Mileage per hour, 15.

September 28. Cyclometer reading 1,564. Left Utica at 8.30 A. M., arriving at Amsterdam, 66 miles, at 11.30 A. M. Road for five miles out good macadam; road to Herkimer very rough; good road to Amsterdam. Took a photograph at Little Falls. Overtook party that had left Utica half hour before us, trying to get up Herkimer Hill by unloading passengers; we went up on second speed. Stopped at Amsterdam for dinner at Hotel Central, and left for Albany, 34 miles, at 1 P. M. Road good to Schenectady. Out of Schenectady followed trolley line for ten miles to the power house, and then turned to the right and took the boulevard for Albany. Arrived at 4.30 P. M. Mileage for day, 100. Hours on the road, 6.5. Mileage per hour, 15+.

September 29. Cyclometer reading 1,664. Left Ten Eyck Hotel, Albany, at 7.30 A. M.; good road out. Got a puncture at Red Hook that delayed us two hours. Reached Poughkeepsie, 74 miles, at 1.30 P. M. Took dinner and supplies and left at 3 P. M. for New York, 76 miles, with patch on tire leaking slowly and provokingly; had to be pumped frequently. Lighted lamps at Sing Sing and took on a boy who knew the road as pilot. Reached New York at 10 P. M. Day's run, 156 miles. Hours on road, 11. Mileage per hour, 14.2. Cyclometer reading 1,820.

H. M. S.



SNAPSHOT TAKEN AT LITTLE FALLS ON THE WAY FROM BUFFALO TO NEW YORK.

SUMMARY OF LOG OF AUTO TRIP FROM BUFFALO TO NEW YORK.

	Left	Time	Arrived	Time	Cyclo. Reading	Miles	Running time, hours	Miles per hour	Gaso.	Stops and Delays
September 26,	Buffalo	11:00 A.M.	Batavia	12:30 P.M.	1378.5	37	1¼	24	8	
" 26,	Batavia	2:00 P.M.	Rochester	5:15 "	1414	35.5	3¼	10	9	Changed battery.
" 27,	Rochester	9:00 A.M.	Savannah	12:30 "	1461	66	3½	19	9	Around marsh.
" 27,	Savannah	1:30 P.M.	Syracuse	3:45 "	1496	35	2½	15	5	30 miles lost road.
" 27,	Syracuse	5:15 P.M.	Utica	8:00 "	1564	49	2¾	13	11	
" 28,	Utica	8:30 A.M.	Amsterdam	11:30 A.M.	1630	66	3	22	8	
" 28,	Amsterdam	1:00 P.M.	Albany	4:30 P.M.	1664	34	3½	10	12	
" 29,	Albany	7:30 A.M.	Poughkeepsie	1:30 "	1738	74	4	18	10	Two-hour puncture.
" 29,	Poughkeepsie	3:00 P.M.	New York	10:00 "	1820	82	7	12	5	

September 26, Day's run, 72.5 miles; time, 4.45; miles per hour for day, 15+
" 27, " " 150 " " 8.30; " " " " " 17.6.
" 28, " " 100 " " 6.30; " " " " " 15.4.
" 29, " " 156 " " 11.00; " " " " " 14+

Total miles for 4 day, 478.5; total runnings, time, 30¾ hours; total gasoline, 77 gallons; average miles per hour, 15.5; miles per gallon of gasoline 6.2.

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Copies printed in 1904, - - - -		639,300
" "	This Issue, - - -	14,000
" "	Since Jan. 1, - - -	730,000

The Society of Automobile Engineers.

During the show week in New York an event of the highest importance to the automobile industry will be the inaugural meeting of the Society of Automobile Engineers, to be held as previously announced, on Monday evening, January 15, at the Grand Hotel. The Society, which was started by a little group of leading American automobile engineers, now includes a membership of fifty, and it is hoped that the gathering next month will result in a very large addition to the membership.

Owing to the enormous area of country over which the membership is scattered and the tremendous activity in the automobile industry, it has not been possible to hold a general meeting of the Society at an earlier date, as most of the members have been unable to spare the necessary time. During the show week, however, automobile constructors from all the manufacturing centers visit New York, and for this reason the attendance of practically the entire membership is expected at the meeting. Many of the members never having met one another, it was decided to get them together socially at an informal dinner before the business and technical sessions of the meeting. At the latter it will be for the members to decide the time and place of future meetings.

It is undeniable that the time is ripe in the automobile industry for the building up of a national technical organization on purely professional lines, such as exists in other branches of engineering—civil, mechanical, electrical and marine. To be of scientific importance, commanding the respect and confidence of the whole industry and of the interested public, such an organization must be free from any commercial alliances or entanglements, directing all its intellectual resources and its activities to the advancement of the arts and sciences connected with automobiles and automobile construction. Already the various commercial interests concerned with the production and marketing of automobiles have their representative national organizations, and the field of sport in automobilism is also adequately represented. The very existence of these bodies indicates the magnitude and the permanency of the industry among the great manufacturing interests of the United States. In the final analysis the industry rests upon the knowledge and skill of the automobile constructor; indeed, the designing rooms are the head waters in which originates the great stream of commercial prosperity of the entire automobile industry. By bringing the constructors of the country together to compare experiences, coordinate data, and supplement individual effort by organized investigation the Society can perform a service the results of which will profoundly affect the entire industry for good.

Considering its purely technical purposes and the public nature of its deliberations and transactions the Society is worthy of the support of all, and the meeting in New York should result in a great extension of its resources and activities due to increased membership and interest. Eligible persons connected with the industry should not postpone applications for membership, which includes Members, Associates and Juniors. They can readily secure all needful information by communicating with the secretary, E. T. BIRDSALL, 136 West Thirty-eighth street, New York city.

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Alleged Irregularities in Vanderbilt Race.

We await with some interest and a good deal of curiosity the mail reports from Paris of the alleged "irregularities" charged against the 1905 Vanderbilt Cup Race management. We have already received a brief cablegram (published in our last issue) and we have read what appear to be garbled reports in the daily newspapers. In these, the international committee which recently sat in Paris is credited with an extraordinary lack of knowledge as to the status of the race management, evidently confusing the Automombile Club of America with the American Automobile Association. The Automobile Club of America has never had any direct official connection with the Vanderbilt race. Its officers and members have taken a deep interest in the great race, and indirectly as one of the constituent clubs of the American Automobile Association, it has participated in the affair. As *the* club of America recognized abroad, and the official mouthpiece of American automobile organizations in their foreign relations, the A. C. A. has served as an intermediary, through which official correspondence has passed. But direct responsibility for any detail of the Vanderbilt race management, it has never sought nor assumed. The actual management of the race was entirely in the hands of a commission composed of the racing board of the American Automobile Association, W. K. Vanderbilt, Jr., and a representative of the Automobile Club of France.

It seems rather late in the day now to bring forward accusations against the good faith of the commission with respect to entries and qualification of the cars entered to race. As a result of its decisions after the eliminating trials for the American cars, the commission was severely censured, and in this we concurred at the time. As to any irregularities in the conduct of the Vanderbilt cup race itself, there has never been even a suspicion that such existed, and we submit that those who were on the ground and closely followed every act of the management, were in a better position to know what happened than those 3,000 miles away. The very absence of criticism—after the severe arraignment of the management subsequent to the elimination trials—is assurance that no irregularities existed. On the contrary, the work of the commission in the conduct of the cup race was above and beyond praise. Its work displayed a thoroughness, a fairness to all home or foreign competitors, and a spirit of good sportsmanship that was admirable in every feature. The men entrusted with the onerous duties of supervision earned the confidence of all interested persons, a confidence that cannot now be shaken by petulant accusations, in questionable taste and lacking every instinct of good sportsmanship.

We are free to admit that there may have been misunderstandings, though we know of cause for none. These, however, could have been dispelled by correspondence in a friendly spirit. It will be satisfactory to learn that such a spirit prevails and that the complete reports will show that the statements of the foreign meeting have suffered from sensational distortion.

✷

Good News from Arizona.

We are glad to be able to publish a news letter from the transcontinentalists in this issue, written by PERCY MEGARGEL, in which he says that the members of the little party are in good health and spirits. Alarming news reports to the effect that the party was lost in snowdrifts in the rugged country near Flagstaff, Arizona, were widely published about the time of our going to press with the last issue; soon happily followed by the announcement that

the tourists had reached Flagstaff in company with a searching party. A dispatch from THE AUTOMOBILE to the party was responded to by the letter we now print. Its tone is cheerfully optimistic, and shows that while the tourists must have endured privations and great hardships, these have not in the least disturbed the determination to complete the trip. Certainly a hearty welcome should await the men on their arrival in New York—after "circumnavigating" the United States in an automobile, and that without the "weather permitting" sign hung out.

In this trip the American touring car has certainly demonstrated its possibilities and to the performances of the automobile another remarkable record is added. Just as rains that stopped railroad traffic did not prevent the cars in the 1903 Reliability Run from reaching Pittsburg, so apparently the snows and low temperatures of the highlands of the Southwest have not proved insurmountable to American pluck and American constructive mechanical skill. Its new use as a life-saving apparatus is notable also, for with his liquid fuel the tenderfoot from the East was able to withstand the rigors of climate that destroyed the native Arizonian.

U. S. Consul Horton, of Athens, writes that the Currant Company of Greece has on foot two enterprises for utilizing the supply of currants withheld yearly from sale, which are likely soon to be put into effect. A concession has been secured from the Boulé (Parliament) for establishing a public automobile service between the various cities and towns of the kingdom which are not situated on railroad lines. These automobiles will employ alcohol as fuel, and will be under the control of a company having 800,000 francs capital. It is reported that Hamburg capitalists are interested in the enterprise, as well as the Bank of Athens and other local banks. A company is also being formed for the manufacture of lamps for lighting that will burn spirits prepared from currants. It is claimed that these lamps give a softer light than electricity and that they are much cheaper. The Currant Company will undertake to furnish spirits of wine to both these enterprises at a fixed and reasonable price.

Means for improving the sliding gear transmission used in automobiles is the subject of a patent recently issued to C. E. Bertels, of Wilkes Barre, Pa. The inventor plans to place a clutch behind the transmission gear, in addition to the usual flywheel clutch; a single lever operates both clutches. When the clutches are withdrawn the transmission gear is cut off from both the engine and the rear wheels, and gears can be shifted as if the car was standing. Any style of friction clutch can be used. The inventor states that he believes the duplication of clutches will eliminate the liability to strip gears.

Washington, D. C., 1,000-mile Non-stop Run

WASHINGTON, D. C., Dec. 23.—Many stirring experiences marked the efforts this week of L. S. Jullien, local agent for the Reo, assisted by R. S. Lockwood and C. C. Singer, of the New York branch of the Reo Motor Car Co., to make a non-stop run of 1,000 miles in a Reo touring car on the streets of Washington. Not only did they have to contend with the most disagreeable weather conditions of the year, but Singer was unfortunate enough to violate the speed law and was haled into court on two charges, being fined $15 on each.

Notwithstanding these handicaps, the plucky drivers persevered in their task and had the satisfaction of completing the requisite distance without stopping the engine. No efforts at record-breaking were made, but the time made—70 1-2 hours—is considered very good under the circumstances.

A 16-horsepower Reo touring car of this year's model, equipped with Goodrich tires, was used, and, excepting the loss of a staybolt, which was quickly replaced, there was an entire absence of tire or mechanical troubles. A Jones combination odometer-speedometer was used to register the time and mileage.

Pennsylvania avenue, Washington's greatest thoroughfare, had been selected for the run, the idea being to run from Washington Circle to the Peace Monument at the foot of the Capitol, a trifle more than a mile in each direction. This plan had to be abandoned eventually, owing to the strict orders that had been issued by the superintendent of police to arrest the drivers on the slightest pretext. Occasionally during the run the trip up and down Pennsylvania avenue was made, but more secluded streets were generally selected for the night runs, while during the day the Conduit road, Chevy Chase road, and other highways leading into the country were used.

The start was made at 11 A. M., December 18, Jullien driving. The car soon warmed up nicely, and two hours later, when Lockwood took the wheel, it was running splendidly. The streets were filled with snow and the conditions seemed all against the run. No untoward incidents transpired until 4 o'clock Tuesday morning, when Singer was held up by a policeman and subjected to arrest. The officer wanted to take him to the police station and lock him up, which would have stopped the run effectually, but Singer prevailed upon him to ride in the car to the garage, where Jullien was aroused and gave bond for Singer's appearance in court. He was fined $30, after a little lecture had been given him by the judge.

Throughout the run the drivers alternated, each taking a turn at the wheel for two hours, after which they had four hours off for sleep. The situation looked pretty bad Tuesday afternoon when the drivers learned that the superintendent of police had issued a general order to all the precincts to make as many charges against the drivers as possible. However, they kept strictly within the speed limits and no charges could be filed against them. The finish of the 1,000 miles was made at 9:23 o'clock Thursday morning.

Jullien expressed himself as delighted with the achievement, which has given the car much prominence here, and he expects to reap considerable benefit in the way of sales.

STRANGE JUDICIAL DECISION.

Philadelphia Judges Hold that Autoists Must Carry City and State Tags.

PHILADELPHIA, Dec. 23.— There was dismay among the local automobile club's lawyers last Wednesday when Judges Willson, Audenreid and Carr, of Common Pleas Court No. 4, handed down their opinion refusing an injunction against the city, the Mayor, and the Director of Public Safety, restraining them from attempting to enforce the provisions of the automobile ordinance of 1902 after the first of the year. They held that there is nothing in the Act of Assembly of last April conflicting with the local ordinance, and that the provisions of both measures must be lived up to by the automobilists of this city.

This decision, if upheld by higher courts, will open the doors for the enactment by cities, counties and towns all over the state of local ordinances compelling automobilists to secure licenses from the authorities of such lesser corporations before they can operate their cars on their roads. To say that the decision was a surprise would be stating the case mildly.

After a day or two the automobilists took steps toward carrying on the fight to a finish. A member of the club, whose car will be decorated with the state tags, but without the municipal tag, will submit to arrest by the city police and the case will then be carried to a conclusion through the various courts.

ILLINOIS FARMERS BUYING AUTOS.

CHAMPAIGN, ILL., Dec. 23.—Farmers of this section are buying automobiles. One finds but few instances of this kind while traveling through the country, but the wealthy farmers are finding uses for autos on the farm.

One wealthy land owner named Phillipi, of Champaign county, recently recaptured one of his blooded bulls by giving chase in his machine. He not only caught up with the animal, but got him headed back home and finally corralled him.

There are about twenty-two automobile owners in Champaign. F. L. Bills, a telephone promoter, originated an apparatus by the use of which his electric machine is

charged. Mrs. Bills usually drives the machine, and she also is able to manipulate the recharging apparatus.

Automobiles are used here by some of the students who are attending the University of Illinois. They are stored in livery stables of Urbana and Champaign.

E. M. Barr, a machinist here, has patented a bevel gear drive giving three speeds forward. He has assembled a complete transmission which he will exhibit at the forthcoming show in Chicago.

A great deal of interest is taken here in automobiling. Farmers and county folk in general are inclined to be fairminded regarding the machines and their use.

TACOMA AUTO SERVICE.

Franchise Asked for Operation of Forty-Passenger Automobile Stages.

TACOMA, Wash., Dec. 20.—Harry Hurley, of the American Automobile Company, of this city, has just secured favorable action from the Council Franchise Committee upon an ordinance granting him the right to operate an automobile service in the streets of Tacoma. The ordinance, which, attorneys say, is the first of its kind in the country, has been under consideration for some time, but there is no doubt of its passage.

Mr. Hurley sees an opportunity because of the wretched street car system of the city to operate an auto service successfully, as the city is growing rapidly. Although an automobile service such as is contemplated might be operated without a franchise, Mr. Hurley wished to feel perfectly safe in the matter, and so went to the council. By securing the passage of an ordinance the company will come under the designation of common carrier.

In accordance with the ordinance not less than two machines shall be operated, and Mr. Hurley says each will have a seating capacity of forty persons. He has gone East to negotiate for the building of cars that will be suitable to conditions in Tacoma.

Tacoma is very hilly and cable cars only are operated by the street car company, as they can ascend the unusual grades. In order to make an automobile safe on these hills they must be of unusual power, and with extraordinary braking appliances.

While sight-seeing autos are used in many cities, the practicability of an auto service as a common carrier in direct competition with a street car system will be given a severe test. But Mr. Hurley is confident and hopes to have two cars in operation before spring.

FARMERS' OPINION OF AUTOS.

CHAMPAIGN, ILL., Dec. 23.—One of the most unique papers ever read before a meeting of farmers was that of B. F. Smith, of Lawrence, Kan., at the fiftieth anniversary of the Illinois State Horticultural Society.

Mr. Smith was invited to prepare a paper on the "Evolution of Transportation," and he brought in the automobile. He said that the contrivance is nothing short of an invention of the devil and he wanted the legislatures to pass a law to stop its manufacture. Farmers are terrified by its appearance on the public highway, he said; some of them are killed, horses run away—and besides, "the thing is of no good to anyone on this earth."

Mr. Smith was a baggage smasher on the Illinois Central Railroad from 1857 to 1868. He afterwards became a berry grower in three states, is now seventy years old and is still raising berries, near Lawrence, Kan. It was because he had had this experience that the society asked him to treat the subject of transportation, and he brought it down from the time that the Queen of Sheba handled dates on the hump of a camel to the day of the automobile—the "wheezing whirler that ought to be wheeled into perdition."

ENFORCING PHILADELPHIA LAWS.

PHILADELPHIA, Dec. 26.—Special efforts are being made to enforce the local speed ordinance, and a number of automobiles have been gathered in during the past fortnight for exceeding the limit. Sections of streets have been measured off and policemen with stop watches have been stationed at these places to time passing automobiles and to make arrests when the speed is excessive.

A detail of policemen mounted on horseback has been stationed in the downtown district, including Broad, Chestnut and Walnut streets, and a corps of patrolmen on motorcycles is being formed to run down operators who cannot be apprehended in the ordinary way. Each man detailed for this special service is provided with a peculiarly shrill whistle that is easily heard above the noise of street traffic, and the offender who gets away from one officer will find his way blocked by others ahead.

The decision to adopt this means of breaking up the scorching evil was due to the increasing number of accidents, petty and serious, consequent upon the daily influx of Christmas shoppers into the downtown section. The arrangement is working so well, say the police officials, that it will doubtless be made permanent. Indeed, that was the original intention.

It is planned ultimately to have fifteen motorcycle policemen.

HANDSOME TOLEDO LIMOUSINE.

TOLEDO, Dec. 23.—James E. Pilliod is the first man in this city to own a gasoline automobile with a limousine body. The car was made in the local factory of the Pope Motor Car Company, its construction requiring nearly a year. The machine, which has just been turned over to the owner, is by far the handsomest automobile seen on the streets of Toledo. It has all the appointments of a first-class passenger coach on a steam road, even to being heated and electrically lighted. It is also fitted with a speaking tube whereby the occupants can communicate with the chauffeur.

The heating apparatus is especially ingenius, being so constructed that heat from the engine will pass into the car when a register is open and into the open air when the register is closed. The engine has four cylinders and generates 35 horsepower.

Mr. Pilliod, who recently returned from an extended European trip, states that the car will compare very favorably with any he saw in Europe.

SUBURBAN CLUBS TO UNITE.

CHICAGO, Dec. 23.—Preliminary plans for uniting the Oak Park and the Austin automobile clubs were made at a meeting held in Austin last week. It is proposed to have the consolidation put into effect with the beginning of the new year. The Oak Park club has a membership of 100 and the Austin club a membership of sixty-five.

Oak Park has long been a conspicuous automobile suburb, because it is John Farson's residence town, while Austin claims Frank X. Mudd as one of her leading citizens. Mr. Mudd was the organizer of the Chicago Automobile Club, and he is one of the leaders in the new movement.

The members of both clubs are persons of wealth, who can easily put the new club to the front. Other prominent automobilists who are in the new movement are Joseph H. Francis, president of the Austin club; W. G. Lloyd, ex-director of the Chicago Automobile Club, and Alderman John E. Scully.

BUFFALO CLUB ELECTION.

BUFFALO, Dec. 23.—The annual business meeting of the Automobile Club of Buffalo was held last Tuesday night in the club's rooms in the Teck Theater Building. The principal business was the election of officers, which resulted as follows: President, H. A. Meldrum; vice-president, F. B. Hower; secretary, Dai H. Lewis; treasurer, Charles Clifton; directors, Edward H. Butler, E. R. Thomas and S. P. White.

Augustus H. Knoll, the retiring president, made his annual report, which showed the club had experienced a prosperous year and is in a flourishing condition. An electric library table lamp was presented to Mr. Knoll by William H. Hotchkiss in behalf of the club. In an interesting address after the election, Mr. Hotchkiss urged the members to be ready to fight any unfair legislation that may be aimed at automobilists during the winter.

NEW DAYTON CLUB OFFICERS.

DAYTON, O., Dec. 23.—The Dayton Automobile Club has abandoned its handsome quarters on St. Clair street and moved to 210 South Main street. At the last meeting Treasurer John R. Flotron said the club

had been at heavy expense and that, owing to its location, the clubhouse was not patronized as it should be.

The following officers resigned: President Charles R. Raymond, Treasurer John R. Flotron, Directors G. W. Shroyer and H. M. Carr.

New officers were elected as follows: President, Bert Wolf; vice-president, J. J. Cooper; secretary and treasurer, W. J. Lukaswitz; directors, John Rock, W. J. Lukaswitz, Louis J. Wehner, Adolph Latin and Jos. L. Schenck.

Under the direction of the new officers it is expected to build up the club.

NEWS NOTES OF THE CLUBS.

WORCESTER, Mass.—Members of the Worcester A. C. held a banquet in the new rooms of the club last Tuesday night, as a formal opening of the new quarters.

NEW YORK.—Among the members admitted to the Automobile Club of America, under its recent decision to raise the membership limit, were C. F. Murphy, Robert A. Van Wyck, Andrew Freedman, Dr. W. Seward Webb, Anson Phelps Stokes and Henry Siegel.

AUSTIN, ILL.—At a recent meeting of the Austin Automobile Club, plans were formulated and approved for the consolidation of the club with the Oak Park Automobile Club, and a committee was appointed to confer with members of the latter organization, and report at a future meeting.

SAN FRANCISCO, CAL.—Members of the Automobile Club of California have pledged themselves to do all in their power to make the new boulevard extending southward from San Francisco a road to be proud of. It is hoped that this road will be the beginning of a highway extending from San Francisco to Los Angeles.

NEW AUTO TIRE FACTORY IN N. Y.

A tire manufacturing concern—the Ajax Standard Rubber Co.—backed by twenty-one automobile manufacturers who will use the tires produced, has secured a building at the foot of East One Hundred and Sixth street, New York, and is engaged in installing the necessary plant for the manufacture of automobile tires; it is understood that raw material is in preparation and that the actual work of making tires will be commenced about January 1, 1906. The automobile builders interested are the members of the American Motor Car Manufacturers' Association, an organization composed of manufacturers who do not acknowledge the validity of the Selden patents held by the Association of Licensed Automobile Manufacturers, and the object of the movement is to secure independence of the alleged pool composed of a majority of the American tire-makers. It is proposed that the independent manufacturers shall take stock in the tire concern in proportion to their consumption of tires; in this way the dividends, if any, will reduce the cost of tires to the automobile builders, though the present prices will not be cut.

The Ajax Standard Rubber Co. has been organized with a capital stock of $100,000. Among those prominent in the movement are J. S. Couzens, of the Ford Motor Co.; Benjamin Briscoe, of the Maxwell-Briscoe Motor Co.; R. B. McMullen, of the A. M. C. M. A., and A. C. Newby, of the National Motor Vehicle Co. The actual work of manufacturing tires will be carried on under the superintendence of Horace de Lisser, who was formerly sales manager for the International Automobile and Vehicle Tire Co., and who understands the manufacturing processes involved.

It is reported that if the project achieves the success that is anticipated by the organizers, the field of operations will be extended to include wheels, bodies, and other parts that automobile manufacturers are in the habit of purchasing.

A BUSY INVENTOR.

Illinois Man with Anti-Skid Tire Protector and Other Devices.

DE KALB, ILL., Dec. 23.—Henry F. Condon, an inventor of this city, who some time ago turned his attention to automobiles, has applied for patents on four inventions, as follows:

A tire protector and anti-skid device; an irreversible tiller lock; a four-wheel steer running gear, and a four-wheel drive.

The tire protector consists of a belt of steel plates each about three-fourths of an inch broad and as long as the wheel rim is wide. In each plate is a longitudinal and a transverse V-shaped ridge, the two crossing at the centre of the plate. These plates, which are curved, are laid edge to edge so as to lie upon the tread of the tire, and are connected together by means of a series of small steel bars that lie in the longitudinal grooves and are held in place by pivots driven through the ridges. To attach the protector, the tire is deflated sufficiently to allow the ends of a master link to be connected when the band is in place. Then the tire is pumped up and the concave plates conform closely to the shape of the tire, the whole belt being drawn tight. The continuous ridge in the centre of the tread prevents side slip, while the transverse ridges give the tire good traction on slippery surfaces.

The inventor says that each belt will weigh about six pounds, a set thus adding twenty-four pounds to the total weight of a car, and that by its use punctures will be prevented. The inventor says that he has a model of the belt in an eastern factory which is to manufacture the device for the market. He does not explain the three other devices, further than to say concerning the tiller lock that it will prevent the steering lever in the hands of the operator from swerving back and forth and from being suddenly jerked out of his grasp. This he plans to apply to his four-wheel steering arrangement.

In DeKalb county and adjoining counties Mr. Condon has an interesting history. He is drawing royalties on thirty-one patents that have been granted to him. For years he has been the right-hand man of Joseph Glidden, who has drawn more than $1,000,000 from royalties alone on a patent on barbed wire.

It may be said that DeKalb is a town of mechanical inventions; it is doubtful whether another in the state of its same size has a more inventive turn of mind.

There are now about twenty-five automobiles owned and operated in the city. There are four electric cars that are kept charged at the electric light plant. One machine is owned by a creamery man who makes the rounds of his creameries in an automobile. The different owners guarantee a joint sum of money in repairs to keep a repair man and garage located in the town. The surrounding country is reached by some of the best roads in Illinois, and they lead over some of the most attractive Prairie State country.

RECENT INCORPORATIONS.

Dac Automobile Supply House, New York; manufacture and deal in automobile parts; capital, $500. Incorporators: Edward S. Griffing, George A. Burkhard, John D. Craig.

Gaulois Tire Company, New York; manufacture vehicle tires; capital, $500. Incorporators: Edward S. Griffing, George A. Burkhard, John D. Craig.

The Appel Spherical Motor Company, Cleveland, O.; capital, $150,000. Incorporators: Daniel Appel, Otto Horix, F. E. Schucister and H. J. Fisher.

Commercial Motor Car Company, New York; capital, $10,000. Directors: P. S. Russell, J. Ingle, Jr., and M. E. Cunliff.

Northern Motor Company, Chicago, Ill.; capital, $15,000. Incorporators: Gordon L. Grey, George A. Rowell, Henry A. Ritter.

Pneumatic Ball Tire Company, Jersey City, N. J.. Manufacture and trade in india rubber and other gums, manufacture automobile supplies, etc.; capital, $3,000,000. Incorporators: F. A. Magowan, Brown McDonald, F. B. Adams.

Automobile Trade Credit Association, New York; capital, $1,000. Directors: F. J. Alvin, E. J. Willis, J. E. Murray.

C. A. Mezger, Ins., New York; capital, $5,000; manufacture spark plugs and motors. Directors: M. Mezger, R. M. Owen and Z. Owen.

New Jersey Touring Company, Atlantic City, N. J.; capital, $60,000; operate and build self-propelling vehicles and vessels for land or water. Incorporators: D. W. Hughes, W. P. Bushell and L. T. Layton.

Motor Vehicle Garage Company, Buffalo, N. Y.; automobile garage; capital, $20,000. Incorporators: J. MacNaughton, F. L. DuBroy and M. D. Ashford.

Cleveland Cycle and Auto Company, Buffalo, N. Y.; manufacture motors, engines, automobiles, etc.; capital, $2,500. Incorporators: J. MacNaughton, F. L. DuBroy and M. D. Ashford.

Park Square Motor Mart Garage, Portland, Me.; capital, $100,000. President, G. A. Hutchins; treasurer and clerk, C. H. Tolman.

A. W. Gump Automobile Company, Los Angeles, Cal.; capital, $25,000. Directors: A. W. Gump, E. B. Gump, Carl Kuen.

News and Trade Miscellany.

That Detroit automobilists are taking a keen interest in the coming Florida races is evinced by the announcement of the Seaboard Air Line that car "B," leaving New York on Sunday, January 21, has been reserved entirely for Detroit automobilists.

The importers of automobiles who will exhibit at the Madison Square Garden automobile show have arranged with the customs officials to have cars which arrive within a few days of the opening on January 13 taken direct to the Garden without waiting for the official inspection. This will save much time and bother in the case of cars arriving at the last moment.

Under the name of the Motor Car Owners' Garage Co., a number of New York men propose to organize a company for the purpose of erecting and maintaining a first-class garage for the benefit of stockholders, whose cars will be cared for and repaired at the lowest possible rates and in the best manner. It is proposed to erect the garage somewhere between Thirtieth and Sixtieth streets and Fifth and Ninth avenues, New York, and to equip it in the most up-to-date manner. A circular letter setting forth the plans of the proposed company and offering stock for sale has been issued by H. W. Poor & Co., 33 Wall street, New York.

At a recent meeting of representatives of the automobile clubs of New Jersey it was determined to keep a careful watch on the doings of the state legislators with reference to automobile restrictions. The automobilists have been stirred up by reports of the preparation of all kinds of drastic and "freak" bills seeking to "regulate" the automobile.

At the annual meeting of the Twin City Automobile Dealers' Association of St. Paul and Minneapolis, on December 22, the following officers were elected for the coming year: President, A. W. Strong; vice-president, W. E. Wheeler; secretary, H. S. Haynes; treasurer, E. H. Moulton, Jr.

Negotiations have been closed by Webb Jay, manager of the Chicago agency of the White Sewing Machine Co., for the lease of the five-story building at 240 Michigan avenue. The new quarters of the branch will open there about the first of next year. It is the intention of the company to establish a Western distributing branch in Chicago.

Smith & Mabley, of New York, have opened a branch in Chicago, with the Hamilton Automobile Co., of 1337 Michigan avenue, as agents.

The first automobile license number issued by the London, England, county council, A 1, is carried by a White steam car owned by Earl Russell. The number has been used on a number of cars successively owned by the earl, but has recently been transferred to his latest machine, the White car.

A complaint against the freight rates on rubber tires has been filed with the Interstate Commerce Commission by the Fisk Rubber Co., of Chicopee Falls, Mass., the company charging the railroads operating west of Chicago with discrimination against rubber tires, chiefly through classification. Other rubber manufacturers are said to be in full sympathy with the Fisk company in making the complaint.

A hill-climbing contest is being planned by automobilists of Los Angeles, California, and if the plans are carried out it will be the biggest event in the automobile line ever held in California. The climb will probably be held in January and a hill favorably thought of is one between Pasadena and Altadena. Neither date nor location has been definitely decided upon, however, though these and other matters will be settled within a short time. It is thought that all events will be for stock cars exclusively.

One of the centers for the automobile trade during show week will be the Hotel Navarre, New York. This hotel, which is strictly fireproof, is in the heart of the Thirty-eighth street automobile district, just away from the rattle and roar of Broadway, at the corner of Seventh avenue and Thirty-eighth street; it is at the same time quiet and accessible. The proprietors, Messrs. Stearns and Dabb, have established a reputation for maintaining first-class service at reasonable rates. The Dutch grille will doubtless be a favorite resort of parties after the show.

It has been definitely decided that a Maxwell four-cylinder touring car of 32-40 horsepower will be shown at the New York show; also a truck, a delivery wagon, a limousine body on a Model H, a Model H, a Model L runabout and a Gentleman's Speedster. The Maxwell-Briscoe company will manufacture eight models during the season of 1906 as against the two models with which it started business.

A road race from Chicago to either Milwaukee, Wis., or South Bend, Ind., is being planned for the early spring by Jerome A. Ellis and some other Chicago racing enthusiasts. E. F. Meyer has already started the ball rolling by offering a cup valued at $1,000.

Judge Barnes, of Chicago, has upheld the findings of the police justices of Evanston in the cases of Robert G. Tennant, Ernest Stevens and E. C. Stokes, who were charged with violating the speed ordinances. The cases were appealed and the police testified to the speed of each, saying a system of signals and stop watches was used which could not be otherwise than infallible.

The suit of the New York Automobile Co. against the H. H. Franklin Mfg. Co., seeking to restrain the latter from building the four-cylinder air-cooled motors designed by John Wilkinson and demanding an accounting for all profits made from the sale of automobiles equipped with such motors, was decided against the plaintiff on December 9. Plaintiff based action on the charge that Wilkinson had been induced to leave its employ for that of the Franklin Co. by the latter; and that the designs incorporated in the Franklin motors were the rightful property of the New York Automobile Co.

A trackless trolley system across Belle Isle bridge, at Detroit, may be built in time for the summer of 1906. Consulting Engineer A. S. Hatch reports the plan feasible from a mechanical point and says it will cost about $52,000. His plan calls for eight cars of a seating capacity of forty passengers each, and a carrying capacity of about seventy-five. The council committee will report on the proposition and a special session of the council will probably be called to finally decide the matter. There are now five companies waiting to bid on the system, one in Boston, two in New York and two in Detroit—the Commercial Motor Vehicle Company and the American Electromobile Company.

A trial will be made in Pittsburg shortly of an automobile chemical engine that will be an innovation in fire-fighting apparatus. The machine will be a 45-horsepower Pierce chassis with extra long wheelbase. It has been ordered by the Bankers Brothers Company, which will equip it with two 50-gallon chemical tanks, six small fire extinguishers, ladders, hose, and the usual equipment of a chemical wagon. There will be room on the running boards for ten firemen. The car will have sufficient capacity to fight small fires or to handle big ones at the start. It will have high speed, which will give it an immense advantage in getting quickly to fires in the remote parts of the residential districts.

Carr & Son, of Lansing, Mich., have placed in service on their hack line a new Oldsmobile hotel omnibus which is the latest construction of the Olds Motor Works. The 'bus has a seating capacity for twelve persons. It is entirely enclosed by curtains, provided with windows, and the driver's seat is similarly protected. It is lighted from storage batteries and heated by a system of piping from the exhaust.

The county commissions have decided that they have no authority to deny the right of the roads between Urbana and Mechanicsburg, O., to the line of auto stages being operated between the two places. After considering a petition from the farmers demanding such action because of the threatened runaways caused by the cars, the commissioners found that as the company operating the line had made no application to them for a franchise, they had no authority in the matter, as the state law gives such people the use of the highways. The farmers are endeavoring to catch the automobiles running at a rate in excess of the limit, which is fifteen miles an hour. Unknown persons have also placed logs on the road which the machines traverse, but so far no damage has resulted.

Plans have been made and a site selected for a new factory for the Wayne Automobile Co., of Detroit, Mich., and it is anticipated that the whole of the new plant will be in running order by next spring, though the contract calls for the completion of certain parts, including the power plant and testing building, by January 15. The works will be on the northwest corner of Piquette avenue and Brush street, Detroit, the main building to have a frontage of 400 feet on Brush street and 300 feet on Piquette avenue and a height of three stories. The testing building, 100 by 36 feet, will be back of the main building. The engine and boiler room will be 30 by 45 feet, and there will be a covered loading platform 150 feet long and 16 feet wide. A private track inside the grounds will be used for testing the cars. All the buildings will be of mill construction and will be fitted with sprinkler systems as a protection against fire.

The board of aldermen of New York City has authorized the expenditure of $10,000 for two automobiles to be used in place of horse-drawn vehicles for the use of heads of bureaus under the control of the president of the Borough of Manhattan. The automobiles are to be purchased without advertising for bids.

The Union Tea Company, of Philadelphia, is contemplating replacing its horse delivery service with automobile wagons. A single-cylinder Knox delivery wagon has been purchased, and accurate data of its performances will be kept, with a view to comparing the two methods.

Mayor Todd, who is promoting a good roads convention, to be held in Jackson, Mich., announces that the date will probably be set for January 4. A number of speakers of reputation will be secured, and the demonstration will be one of the largest ever held in the State.

Ford cars are likely to be well represented in Philadelphia next year, Manager L. E. Hoffman, of the local store, having already booked orders for nine of the 1906 six-cylinder cars and eighty-nine of the Model N type.

The Douglas Andrews Company, of New York, has secured the selling agency for the entire output of the factory of the Berkshire Automobile Company of Pittsfield, Mass., and will handle the output direct, placing no agencies. In all probability he will open stores in the large cities.

William Dominick, president of the Chicago Automobile Club garage, has built a four-cylinder engine that has several striking innovations. He is now organizing a company to place a new car fitted with his engine on the market. It will be called the Dominick.

Among the recent agencies established in Philadelphia are: The Penn Motor Car Company, 680 North Broad street, which will handle the Mitchell line; and the Hamilton Automobile Company, 206 North Broad street, which will represent the Stoddard-Dayton.

The Miami Automobile Co., of Miami, Fla., incorporated some months ago, has taken the agency for the well-known Reo, Pope-Hartford and Pope-Tribune cars.

The American Motor Car Co., Indianapolis, Ind., has removed its factory to the Atkins building on South Capitol Avenue, and is now installing a complete machinery equipment, preparatory to the manufacture of its four-cylinder cars in quantity.

The Reo Motor Car Company has closed the following agencies for the handling of the Reo cars: Southern Ohio and northern Kentucky, Joseph T. Montfort, of Cincinnati; St. Louis, The Colonial Automobile Co., of 3944 Olive street; Sioux City, Ia., and vicinity, H. Bernard Hallam; Newark, N. J., Harry R. Drake & Sons.

J. A. Cramer, the automobile dealer of Buffalo, N Y., is now fitting up a portion of his salesroom for the display of a complete line of automobile sundries, which he has arranged to handle.

The Eastern Automobile Company, of Philadelphia, Pa., handling the Peerless and Stevens-Duryea cars, having outgrown its present quarters, is now building an addition to its establishment on North Broad street, which will give the company several times its present capacity.

The erection of a brass and iron foundry has just been started by the Standard Roller Bearing Co., of Philadelphia, Pa. The new building is to be 60 by 125 feet, two stories in height.

J. W. Hayden, of 1337 Michigan avenue, Chicago, announces that he has been appointed exclusive agent for Prest-O-Lite gas tanks.

C. W. Kelsey, sales manager of the Maxwell-Briscoe Motor Car Co., has invented a new suspension or shock absorber, which is attracting attention. It acts only on the rebound of the spring, and while giving the spring a chance to perform its full function, nullifies the effect of a bump in a way that makes tonneau riding exceedingly comfortable. The suspension has been tried on Maxwell cars with success, and a company has ben organized to manufacture and market.

H. W. Doherty, with headquarters at 1024 Boylston street, Boston, has been appointed New England representative for Dolson cars.

The Essex Automobile Company, agents in Lynn, Mass., for Pierce, Ford and Cleveland cars, has opened an office and salesroom at the Oxford Garage, 197 Broad street.

The Iron Clad Manufacturing Company, of Brooklyn, N. Y., followed its annual custom on Saturday, December 23, of presenting each of its 1,500 employees with a Christmas basket containing all the good things required for a fine dinner.

The Mexican agency for the Panhard cars has been given to Charles L. Seegar, of the City of Mexico.

The annual meeting of the Bay State Automobile Association will be held on Monday, January 1, 1906, at the clubhouse, The Casino, Auburndale, Mass., at 3 P. M.

The New York agency for Hotchkiss automobiles has been secured by Archer & Company.

The Waverly Electric Automobile Company, Atlanta, Ga., agents for the Pope-Waverly Electric vehicles, have opened a handsome showroom on North Pryor street, opposite the Marion Hotel.

Howard P. Foster, of Bay Shore, L. I., has secured exclusive rights for the Wayne car in Brooklyn and Long Island.

Hatch & Company, New York agents for the Compound cars, have opened their new headquarters at 1655 Broadway.

On January 1, 1906, an automobile garage and repair shop will be opened in Memphis, Tenn., at 346 Madison street, by Frank C. Blomberg & Company, who have secured the agency for the Baker electrics and the White and Thomas cars.

Injunctions have been issued against the Columbia Dry Battery Co. and the Vim Co., of Chicago, forbidding them to offer for sale batteries bearing the name "Columbia." Suit was brought by the National Carbon Co., of Cleveland, O., which owns the trade-mark "Columbia," and the injunctions were issued December 12.

The chassis of the regular 16-horsepower touring car of the Reo Motor Car Co., of Lansing, Mich., is used not only for the Reo coupé, described in THE AUTOMOBILE for December 21, but also for the Reo ten-passenger wagonette; in fact, the three bodies are interchangeable, and the change from one to another can be made in an hour's time.

John R. Bensley, who was connected with the Western Automobile Company, of Chicago, when that concern had the agency for the Maxwell cars, is now associated with the Holmes-Schmidt Motor Company, present agents for the Maxwell Company in Chicago. This latter company has also secured the services of C. H. Plumb, formerly with the Mead Motor Company.

The Mead Motor Company, of 1243 Wabash avenue, Chicago, has relinquished the agencies for the Glide, Moline and Gale cars, and during the coming season its energies will be devoted to the marketing of the Benz cars, of which this company is the sole American importing agent.

The Branstetter Motor Company, handling the Queen car, has opened at 1337 Michigan avenue, Chicago.

The Grout line of cars is to be handled throughout New England by H. H. Hawkins, formerly manager of the Boston agency for Darracq and Franklin cars.

The agency for the Maxwell car in Dixon, Ill., has been taken by Phil Miller.

T. B. Van Alstyne, sales manager of the St. Louis Motor Car Company, of Michigan avenue, Chicago, while returning from a recent trip to New York, stopped off at Binghamton long enough to marry one of Binghamton's prettiest girls.

The recently organized Hamilton Automobile Company, of Chicago, has opened temporary headquarters at 1337 Michigan avenue. B. C. Hamilton and B. G. Sykes, until recently with the Chicago branch of the Locomobile Company, are prominently connected with the new company, which is now arranging to handle Smith & Mabley's complete line.

The Buick Motor Company, of Jackson, Mich., sold through its Chicago branch recently three model C cars to the Roswell Automobile Company, Roswell, N. M. The cars are to be put in service to carry passengers, baggage and U. S. mail between Roswell and Torrance, N. M., a distance of 111 miles, the contract with the government calling for two trips daily, each trip to be completed in seven hours, under penalty of a $250 fine for every default.

INFORMATION FOR BUYERS.

DRY STORAGE BATTERY.—The dry battery and the storage battery each possess their peculiar points of advantage for ignition work and in order to combine as many of the good points as possible in a single battery, the Royal Battery Co., of 143 Chambers street, New York, have placed on the market what is called a dry storage battery under the trade name of "Geecee." Instead of the liquid electrolyte ordinarily used in storage batteries the Geecee battery is filled with a gelatinous substance which, the manufacturers state, is capable of retaining moisture indefinitely; at the same time it cannot be spilled, and it acts as a separator for the plates, which are thus held firmly in position and short circuiting is prevented. A layer of white wax placed on the top of the electrolyte prevents it from shaking loose. The manufacturers also state that the plates are made of a new alloy; the positive plates are guaranteed for two years and the negative plates for three to four years. The jars are made of fiber, which is strong and yet light; a leather carrying strap makes the battery easy to move about. The trimmings, screws and binding posts are of nickled brass. Batteries are shipped fully charged and the battery as a whole is guaranteed for two years. The same company manufactures a charging outfit for charging Geecee batteries; this can be used wherever a direct current of 110 or 220 volts is available. A convenient novelty is a pole-finder which consists of a special paper strip which, when wet with water and brought in contact with the two wires of any circuit, will turn red at the negative pole. This is a positive test and should be very useful in cases where there is any doubt as to the polarity of the terminals.

NON-FREEZING SOLUTION.—An interesting leaflet on the subject of anti-freezing solutions has been issued by Thos. B. Jeffery & Co., of Kenosha, Wis., manufacturers of the Rambler automobiles. A thirty per cent. solution of a mixture of half wood alcohol and half glycerine, the leaflet sets forth, will not freeze at a temperature of 15 degrees below zero, according to Henry Souther, and the deleterious effect on the metals of the circulatory system is probably less than that of any other solution available. A small quantity of wood alcohol added from time to time replaces what is lost by evaporation, and water also, in greater quantity must be added; the glycerine does not evaporate.

LOCOMOBILE RACING PICTURES.—A set of

twelve souvenir postal cards bearing as many different views of the 90-horsepower Locomobile racer driven by Joseph Tracy in the Vanderbilt Cup Race has been issued by the Locomobile Co. of America, of Bridgeport, Conn., and gives an excellent idea of the appearance of the car which finished third in that contest. The cards show the start, the finish and various intermediate incidents, speed on the straight stretches, taking the risky corners and stopping for supplies.

PITTSFIELD IGNITION APPARATUS.—The vibrator coils that are being manufactured for the season of 1906 by the Pittsfield Spark Coil Co., of Pittsfield, Mass., are said by the makers to be original throughout and to be extremely rapid and efficient in action, economical in current consumption and susceptible of a wide range of adjustment. The manufacturing plant is being enlarged so that its capacity will be doubled within a short time. The new coil has a vibrator of what the makers term a semi-hammer-blow type and the construction is such that the sticking or "freezing" of the contacts is obviated and the wear of the platinum points greatly reduced. The armature is independent of the main spring at the contact end; the armature on making contact does not stop abruptly, but swings on a little, gathering force for the return. When it swings back it exerts considerable force tending to separate the contact points and, if there is a tendency to "freeze," jerks them apart. A wide range of adjustment is secured by providing, in addition to the tension adjusting screw in the block, an auxiliary tension spring, so proportioned with relation to the pitch of the thread on the adjusting screw that it can only be adjusted to a point where the maximum consumption of current compatible with economical operation is reached. Provision has been made for taking up wear in the adjusting screw, and the friction is sufficient to prevent any possibility of jarring out of adjustment. The length of spring between the block and the armature is very short and this, combined with the double spring arrangement, gives exceedingly rapid vibrations and makes the coil quick in action. The platinum point on the vibrator is attached to the spring, and not to the armature; it projects through the armature and, when brought against the stationary contact is cushioned by the spring; this arrangement avoids the hammering and wasting of the platinum. The illustrations give a good idea of the general appearance of the Pittsfield coil. The Pittsfield ignition current switch is also illustrated, and, as will be noticed, is made with unusually substantial parts. The swinging end of the lever is fitted with a wedge-shaped contact piece which drops into recesses, of similar shape, between the blocks, making close and positive contact and remaining secure from accidental movement, as the lever must be raised before the wedge can leave its recess. The handle can be removed by turning it round at right angles to its central position. Another product of the Pittsfield Co. is the Jewel mica insulated spark plug, which has been newly designed for the 1906 trade. The mica core is ground to a bevel which exactly fits an accurately formed bevel in the shell. By inserting the core in the shell and tapping it lightly the surfaces are brought together gas-tight. The core is as easily removed by rapping it in the opposite direction. A simple brass terminal is usel for making connection with the high-tension cable.

PITTSFIELD DOUBLE COIL.

PITTSFIELD IGNITION CURRENT SWITCH.

ATTRACTIVE ADVERTISING.—A 1906 calendar recently issued by the Detroit Steel Products Co., of Detroit, Mich., is an unusually artistic piece of work. The calendar proper is mounted on the lower part of a dark gray cardboard 20 inches high and 16 inches wide; but the feature is the head of a Cheyenne chief done in subdued colors and covering the larger part of the mount. The head is so deeply embossed as to present almost the appearance of a bas-relief; the general effect is excellent, and represents an unusually high class of advertising work.

AUTO JACK.—The satisfaction of having a reliable jack at hand for use in case of an emergency ought to be appreciated by all automobilists. A very powerful jack that occupies but little space in the tool-box is the Covert Automobile Jack, of which the Covert Mfg. Co., of Troy, N. Y., is sole manufacturer.

POPE DESK CALENDAR.—The desk pad calendar which has come to be a regular annual issue of the Pope Mfg. Co., of Hartford, Conn., has appeared for 1906, in its usual convenient form, with a leaf for each day. Each leaf has a space for memoranda, and an occasional leaf bears a record of some Pope automobile achievement of particular interest. The calendar is a familiar sight on the desks of those interested in the automobile.

OLDSMOBILE SOUVENIRS.—A set of handsome colored picture post cards illustrating incidents in the transcontinental race between two Oldsmobile runabouts has been issued by the Olds Motor Works, of Lansing, Mich., and forms an attractive souvenir of the event. The difficulties, dangers, bad roads and so on are graphically shown and the conclusion reached after looking at the cards is that the winner certainly earned his prize.

SHAPES OF WIRE.—Anyone who holds the idea that wire is necessarily round in cross-section will learn a good deal by reading the November number of the American *Wire Rope News*, the house organ of the American Steel and Wire Company, published at The Rookery, Chicago. A very interesting short article is illustrated by engravings showing the various forms taken by modern soft steel and brass wire. Pinions are quickly and inexpensively made by sawing slices from a length of pinion wire; and the metal is also drawn to the form of mouldings, gun ribs, channel forms and numerous other irregular shapes. Each form is the result of the needs of some class of manufacturers, whose work is much facilitated by the special forms.

AUTOMOBILE SCHOOLS.—The scarcity of good chauffeurs and practical automobile mechanics, as well as the desire of owners and prospective owners of cars to know more about their machines, has caused the establishment of a number of automobile schools in various parts of the country. These schools give practical and, in some cases, also theoretical instruction regarding automobiles, their construction and operation and their adjustment and repair. Among these schools are the Hub automobile school, of 195 Freeport street, Dorchester, Mass.; the Foljambe school, of 70 Stanhope street, Boston, and the Y. M. C. A. school in Indianapolis, Ind. The student at any of these can become thoroughly acquainted with the practical work of the chauffeur, both on the road and in the garage, under favorable circumstances as well as when in difficulties; for when trouble does not come uninvited on the road, the machines are put out of order purposely and the student is set the task of rectifying the trouble. The first mentioned schools have shops equipped with the requisite benches, vises and tools and also with automobile parts for examination; the last named school has access to the works of an automobile manufactory for the same purpose. Practical men are selected as instructors; they know just what the chauffeur will have to encounter, and prepare him accordingly. Detailed prospectuses are issued by the different schools and may be obtained by intending students on application.

STANLEY 1906 CARS.—An illustrated catalogue has been issued by the Stanley Motor Carriage Co., of Newton, Mass., illustrating and briefly describing the Stanley seam cars that will be placed on the market for the 1906 trade. These comprise a side entrance touring for five passengers; the wheelbase is 100 inches; boiler is 20 inches in diameter and the engine 3 5-8-inch bore and 5-inch stroke. A smaller side entrance touring car carries four passengers and has a 90-inch wheelbase, 18-inch boiler and 10-horsepower engine with cylinders of 3-inch bore and 4-inch stroke. The same size engine is fitted to a folding rear seat runabout. The foregoing models all have round front hoods, artillery wheels and wheel steering gear. The regular Stanley light runabout, with 16-inch boiler and 8-horsepower engine, cylinders of 3-inch stroke and 4-inch bore, is also listed. These machines may he had with either solid or folding front seats. A special speeding car for two passengers will be fitted with either 15-horsepower or 20-horsepower engine and will have wheel steering, wire wheels and divided front seats. In all models the engine, as in the past, is enclosed in a sheet copper casing which protects it from dirt.

MISCELLANY.

Continued increase in the size of automobiles and the growing popularity of limousine and landaulet bodies has created great difficulty in the loading of the vehicles into freight cars for shipment. A demand for end-door freight cars has been the result, and even thus early in the season a marked dearth in this class of cars has resulted. Although the railroads, almost without exception, declare that more of the end-door cars have been ordered, it is considered probable that they will not be ready for service much before spring. In the meantime shipments may be delayed. This condition was anticipated by the E. R. Thomas Motor Company, which has made an iron-clad arrangement with the railroads by which end-door cars must be delivered at the doors of its factory in sufficient numbers to meet the output of its plant. The benefit of this course has already been felt, deliveries being made on time where otherwise a delay of days, and possibly weeks, might have been caused.

An interesting experience was that of C. F. Steele and Joseph Germain, who delivered an automobile to C. G. Freeman, of Onaway, northern Michigan, the first one ever seen in that vicinity. The trip of seventy miles was made in a little more than seven hours, many stops being made to satisfy the curiosity of farmers. Travel was difficult, there being five inches of snow on the ground. The trip over the jack pine plains to Valentine lake was a lonely one, and from Valentine to Onaway, a distance of twenty-four miles, was still more dreary. Only one person was seen in thirty-six miles of travel, an old lady, the sole inhabitant of Valentine.

The Foss & Hughes Motor Car Company, of Philadelphia, have been appointed representatives from that city of the committee having charge of the beach races at Ormond, Fla., next month.

The Winton and Franklin agency managers in Philadelphia helped out the local Santa Claus Society by loaning it four automobiles to distribute among the poor the mountain of gifts its members had collected.

Philadelphia is to have a new automobile accessories establishment—the Penn Auto Supply Company. A "row" location is being sought by the manager, A. F. Justice.

The Maxwell-Briscoe Motor Company has finally decided on a Western location for an assembling plant, and has closed a deal whereby the company obtains possession of a large factory at the intersection of Seventy-third street, Kimbark avenue and the Illinois Central Railroad, Chicago. The acquisition of this plant gives the company 40,000 square feet of space, which will be put in service at once.

INDEX TO ADVERTISERS

Continued on page 42

PROMINENT AUTOMOBILE AGENCIES AND GARAGES

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*NOTE—Letters in upper right hand corner of each card indicate as follows: G—Garage or storage facilities, E—Equipped to charge electric vehicles, R—Repair Shop.